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Organ of the American Association of the History of Medicine and The Johns Hopkins Institute of the History of Medicine

Editor—Henry E. Sigerist
Associate Editor—Genevieve Miller

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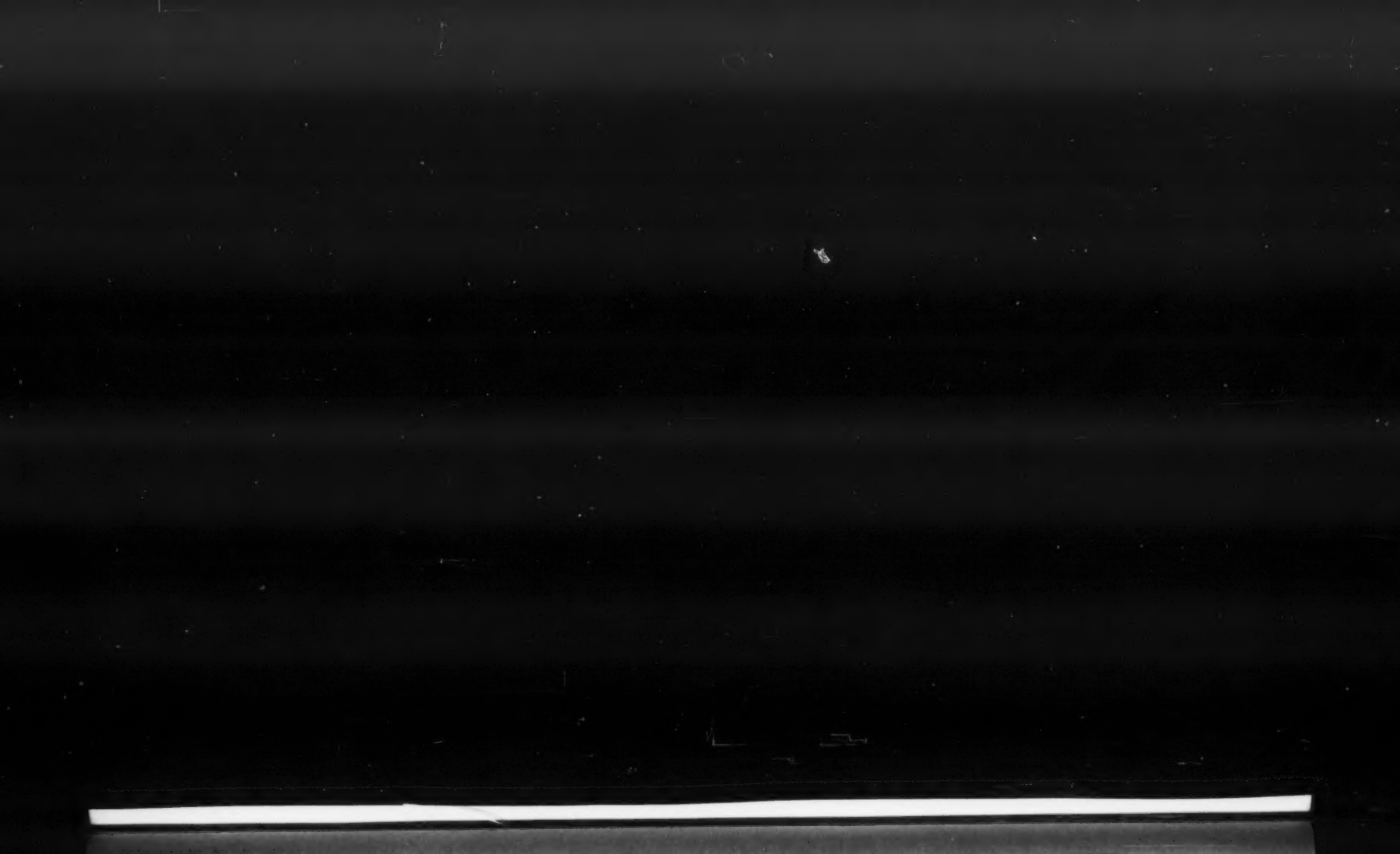

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THE NEED FOR AN INSTITUTE OF THE HISTORY OF MEDICINE IN INDIA

HENRY E. SIGERIST

It is no longer necessary to stress the value of studies and of academic instruction in the history of medicine. Since 1905, the year when the Leipzig Institute was founded by Karl Sudhoff, one country after another has developed similar institutions. They became cultural centers from which the field of historical studies was broadened considerably and medicine was greatly enriched.

A survey undertaken in the United States in 1937 revealed that courses in the subject were offered in 54 of the 77 medical schools then existing.[1] It must be admitted, however, that in the majority of these schools the standard of instruction in medical history was far below their general academic standard, and that only very few of them engaged in serious research. Nevertheless, the mere fact that 70 per cent of all medical schools thought it advisable to include medical history in the curriculum shows that the significance and possibilities of the subject have been recognized.

I.

In a country such as India a center of studies in the history of medicine is more necessary than anywhere else, because in India ancient and mediaeval medicine are still alive and are practised on a large scale. It is

[1] *Bulletin of the History of Medicine*, 1939, 7: 627-662.

no exaggeration to say that the overwhelming majority of the people of India receive medical care only from indigenous practitioners. They either follow the principles of the *Ayurveda*—the Science of Longevity—as it developed in the Atreya school of Brahmin doctors over two thousand years ago; or they are adepts of the *Unani*, or Greek school of medicine which actually is Arabo-persian medicine—to mention only the two major systems.

The fact that indigenous medicine plays such a very important part in the life of the Indian people is frequently minimized or even ignored. And yet it represents a very tangible reality that must be faced openly whenever plans are elaborated for improving the health conditions of the country, particularly since its popularity is growing rather than diminishing. New indigenous schools are being founded. They are subsidized by the government in several provinces. The Osman University of Haiderabad has a Medical College which is a Unani Medical College. The Medical Practitioner's Act of Bombay of 1938 admits graduates of indigenous schools to the Medical Register.

At first sight it seems strange that these ancient indigenous systems are able to compete with modern scientific medicine. It was not strange in the 17th and 18th centuries when the two worlds first entered into contact. At that time European medicine was developing new theoretical foundations but in practice, in the treatment of disease it was hardly more effective than Greek, or Hindu, or Arabic medicine. But today? Nobody can deny that scientific medicine during the last hundred years has made tremendous strides. Bacteriology and immunology have permitted us to combat communicable diseases most effectively and to eradicate many of them. Modern surgery is able to save thousands of human lives that would have been lost only fifty years ago. Pediatrics, more than any other branch of medicine, is responsible for the decrease of death rates and for the greater life expectancy. The treatment of internal diseases, for a long time the step-child of medicine, has greatly progressed also. The discovery of hormones and vitamines made it possible to attack certain diseases at the root, and in the last few years the sulpha-drugs and penicillin have proved to be formidable weapons in the treatment of many formerly deadly diseases. How then was it possible for indigenous medical systems to survive?

The reasons are not difficult to find. India with its 19 University Medical Colleges and 19 Medical Schools has produced physicians trained in scientific medicine, but not enough of them. It is impossible for 55,000 doctors to give medical care to a population of nearly 400 million, par-

ticularly since economic necessity forces the majority of doctors to practise in the cities, while 90 per cent of the people live in rural districts. The sick villager, therefore, has hardly any choice; if he wants help and advice he must have recourse to an indigenous practitioner.

There are Rural Dispensaries operated by the provincial or local governments, staffed with scientific doctors. These dispensaries, however, are as a rule very poorly equipped; the doctor sees hundreds of patients every day, so that he has not the time to examine the sick and to treat him individually. He can at best practise a primitive type of first-aid and bottle-medicine which are hardly apt to demonstrate the superiority of Western medical science. The salary of the dispensary doctor, moreover, is so miserably small, that he is forced to make a living through private practice. But the average villager is too poor to pay for his services and to purchase his imported chemical drugs. And so the sick call on the indigenous practitioner who himself is a villager, whose drugs consist of native herbs that are cheap, and whose theoretical views conform with the religious views of the patient.

The indigenous systems of medicine, both Ayurveda and Unani, are strongly philosophical in outlook, although their original character has degenerated in many ways. The theory of the three elements in one, of the four humors in the other, are attempts to visualize the organism as a microcosm and to place it into relationship with the macrocosm of the universe. Hindu philosophy as it crystallized in the system of the Tantras, looks at the human body and at the universe as a manifestation of divine substance and energy, a concept the elements of which can be traced back to Vedic traditions. The three elements wind, bile, and phlegm are symbols of the aerial, fiery, and liquid forces of life-energy. Throughout its history Ayurvedic medicine was an attempt to interpret the phenomena of life and death, of health and disease, philosophically.

Unani medicine, on the other hand, through the Persian and Arabic tradition goes back to Galenic, Hippocratic and Pythagorean views and having passed through the filter of Avicenna, it acquired many elements of Aristotelian philosophy.

Indian culture is deeply imbued with philosophy, and this is why not only illiterate villagers but highly educated men sometimes prefer the indigenous systems to scientific medicine and rise to their defense. They claim that the medicine that came from the West is too mechanical, that it is soulless, that it has no philosophy, that it is foreign to Indian thought, while the indigenous systems are deeply rooted in the religious and philo-

sophical traditions of the country, and represent one aspect of the general attitude toward nature and man.

There is another most powerful force that is backing the indigenous systems of medicine, Indian nationalism. The country is in a period of transition. After centuries of stagnation the people of India are awakening to new life and look into the future. A regular Renaissance is taking place. A nation which had developed a great civilization at a time when we in the West were still savages, which for certain historical reasons too complex to be discussed here declined, is now reasserting itself.

At such a historical moment the people look back with pride to their cultural heritage. It is the common ground on which they stand. The classical literature is published in new editions. The cinema instead of filming gangster stories revives Śakuntala. Young girls dye their palms and soles with henna and re-enact old dances. The country's archaeological remains are carefully preserved, tactfully restored, and visited by thousands. Hindus and Moslems, Sikhs and Parsis alike admire the paintings of Ajanta, the sculptures of Elefanta, the temples of Madura and the palaces of the Mogul emperors. They justly feel, beyond communal lines, that they are theirs.

And when it comes to medicine, they remember their history also. Just as we look to Hippocrates as the father of medicine, they look to their own classics to Caraka, Suśruta, Vāgbhaṭa who collected and preserved the medical lore of their time; or to the classics of Arabic and Persian medicine who in the early Middle Ages had assimilated, enriched and systematized the Greek tradition and were far ahead of their colleagues in the West. Indians remember with pride that in the 3rd century B. C. Aśoka, the great Buddhist Maurya king had provided medical services for rich and poor, for men and animals, throughout his empire; that he had hospitals built in town and country, for men and animals, at a time when there was not a single hospital in the Western world.

This great medical tradition is not dead. It is alive like the Vedas, the Upaniṣads or the immortal Meghadūta, like the Qoran, the Bustan and the Gulistan. It is no wonder that India reasserting itself is backing up its own systems of medicine.

II.

So far, so good—but medicine is neither poetry nor philosophy. It is a craft, a techne as the Greeks called it, with an eminently practical purpose. Its goal in every country is the same, namely to promote the people's health, to prevent disease, to restore health when it has broken

down, and whenever necessary, to rehabilitate the former patient so that he may remain a useful member of society.

The question naturally arises: have the indigenous systems succeeded in establishing a high standard of health in India? The question can be answered scientifically because health conditions can be measured and can be expressed in figures. When we consult these figures and find that in 1937 the general death rate was 22.4, the infantile mortality rate 162, and the average life expectancy only 27 years, we must conclude that health conditions are very bad in India today, infinitely worse than in countries that have universally accepted scientific medicine.

It is well known that health conditions are determined not only by the status of medicine but also by the general standard of living—which in India is extremely low. When people have not enough to eat, constantly suffer from malnutrition and live in a poor sanitary environment they are always threatened by disease and have little resistance to offer. Scientific medicine, however, has forged weapons with which it is possible to eradicate diseases even under poor living conditions. The numerous diseases carried by water and food can be brought under control by general public health measures. The various methods of immunization permit the prevention of diseases which today still take a heavy toll of life in India, and the new methods of treatment can save thousands of human lives that would be lost otherwise. The incidence of malaria, India's great curse, could be reduced considerably if the doctors had enough auxiliary personnel available that they could steer and guide.

If Indians take a historical attitude toward their indigenous systems of medicine, they will be justly proud in realizing what a great advance these systems represented *at their time*, in antiquity and the Middle Ages. They brought many effective drugs to the people, many valuable dietetic and even surgical treatments. But Indians will also realize that conditions have greatly changed. The new science that developed from the 16th century on created a new foundation of medicine, a new anatomy, physiology and pathology on the basis of which new systems of public health and of clinical medicine could be developed with infinitely more effective methods of prevention and cure. The theory of medicine, the views we have of the causes and mechanisms of disease are not a luxury but determine our actions. The concepts of wind, bile and phlegm or of blood, phlegm, yellow bile and black bile represented useful working hypotheses at their time, but the new science has demonstrated that the actions attributed to them are the result of speculation and do not correspond to a reality, while it is possible to explain the phenomena of health and disease

with concepts of biology, physics and chemistry in an infinitely more satisfactory way, one that permits testing in experiments and has led to brilliant practical results.

Indians, therefore, who have the welfare of their people at heart, who want them to live without being constantly fettered by the bonds of disease, cannot but accept scientific medicine and work to promote it and to see it applied on a nation-wide scale so that it may reach every single village. It, of course, is not easy to apply modern science to one field of human endeavor while other basic functions of social life such as agriculture and industry remain mediaeval and women are kept in purdah. And this raises the question: is it at all desirable for a nation to accept science and technology or would it be better for the people to remain static, to live poor and contented, bearing sufferings with resignation, leading a contemplative life and hoping for a better lot in the hereafter? The question seems justified in view of the evil use that has been made of science in recent years. It is futile, however, because there is no choice. No nation can expect to survive in the present world as a nation unless it accepts science with all its implications. And science in itself is neither good nor evil. It is an instrument in the hands of man, and it is he who is good or evil.

India, after centuries of stagnation, is awake today and has expressed its determination to free the people from age old bonds. Thousands of young men and women are flocking to the universities, hundreds of them travel abroad for post-graduate study. Already India has produced physicists, chemists and biologists of world renown. Industries are being developed. The great rivers dammed by engineering skill, will produce water for irrigation and power for new industries that will absorb the rural surplus population. India possesses the manpower and natural resources needed to make it a prosperous country in which the people will be free to produce new cultural values as they did in the past. This may seem Utopian in view of the many traditional barriers of caste and religious taboos that tend to divide the people, but the example of other countries has shown that however rigid the traditional superstructure may appear, it breaks down very rapidly where there is a strong popular movement that attacks the basic elements of economic and social life.

In the same way scientific medicine must be developed. Promising beginnings have already been made and plans are elaborated for the future. The line to be taken is clear. The country needs more and better trained personnel, researchers, teachers, doctors and legions of auxiliary personnel. It needs more and better equipment. And it needs first of all a system of

health services that will make full use of the personnel and equipment available and will bring it into the reach of everybody.

Scientifically trained doctors will gradually replace the indigenous practitioners. The argument that indigenous medicine is cheaper will no longer hold, because medicine will not be a service that is sold to the people in the open market, but a public service to which they are entitled, one that is financed on public funds. Similarly the argument that indigenous drugs must be preserved because they are within the financial means of the villager will vanish, because drugs will not be sold but distributed to those who need them, and the development of a state-owned and operated pharmaceutical industry will considerably reduce the cost of production of modern scientific drugs.

Such a development will obviously take a long time, and meanwhile the country will continue to have tens of thousands of indigenous practitioners, registered and non-registered, trained in schools and trained through apprenticeship. It would be worthwhile to study whether these practitioners could not be used during the period of transition as auxiliary personnel. In some of their schools students are given a sprinkling of scientific medicine, and while it is obviously impossible to combine modern medical science with ancient and mediaeval theories, it should be possible to train these students for a few specific functions such as the combating of malaria, vaccination and other immunizations, the supervision of wells and latrines and other public health measures.

III.

It seems to me that in such a period of transition an Institute of the History of Medicine could play a very important part.

The Government of India plans to establish a National Medical College, a model medical college that would become a national center of medical research and a training ground for highly qualified physicians, specialists, and academic teachers. This undoubtedly is an excellent plan that will give a tremendous stimulus to the development of medicine in India and will raise the standard of medical education and consequently of practice.

The opportunity of creating a new school is one that occurs very rarely and presents great opportunities that should not be missed. It is extremely difficult to modernize an old school that is burdened with the weight of a great tradition. A business enterprise that does not keep abreast of the time soon collapses, but out-moded universities may carry on indefinitely, much to the detriment of the country.

Whoever founds a new medical college today must be fully aware of the changes that have occurred in medicine and society and of the social and economic structure into which the products of the college, the physicians, will have to fit. It would be a mistake therefore merely to copy a British or American pattern. When the Johns Hopkins School of Medicine was opened in Baltimore in 1893 it was neither a replica of a British, French or German school. It had taken over elements of the various European systems but had blended them to form a new pattern that was in many ways better than the existing ones, and this is one reason why the school became so influential.

India is neither Britain or America. It is a tropical country, and its social and economic structure is totally different. And while the medical science in which students are instructed is basically the same all over the world, the application of this science varies a great deal. In small countries such as Switzerland or Holland the problem of rural medicine hardly exists because cities are never far away and hospitals and specialists can be reached easily. In tomorrow's India the great majority of all doctors must be scientifically well trained physicians prepared to practise in rural districts among poor people under an organized system of medical services. But they will have to be more than mere therapists; they will have to be teachers and social workers, leaders and friends of the people, leading them to a healthier and happier life. An Institute of Social Medicine should, therefore, be considered.

The new college, I am well aware, intends to be primarily a center of research and a training ground for specialists and teachers. It is just for that reason that it should emphasize the social aspects of medicine. Research is needed not only in the science but also in the sociology of medicine—and in India perhaps more than anywhere else. It is a fallacy to believe that the application of scientific results takes care of itself. It does not, as we have found in every country, and the most brilliant discoveries are wasted unless they can be applied on a mass-scale. The teachers who will come from this college, on the other hand, no matter whether they are physiologists or surgeons should all carry that social outlook into whatever colleges they may be called. The National College will set a new pattern of medical education in India, one that undoubtedly will be followed by the other schools.

Similarly, since India is confronted with the problem of indigenous medical systems and will be so for a long time, an Institute of the History of Medicine could greatly help to clarify the situation, and I should like to outline briefly what I would consider the major tasks of such an Institute.

The history of medicine is both history and medicine. It is a historical discipline like the history of art or the history of philosophy. It helps to give us a more complete picture of the history of civilization, because it is obviously not unimportant to know what diseases affected the people in the past, what they did to protect and restore their health and what thoughts guided their action.

But the history of medicine is also medicine. By analyzing developments and trends it permits us to understand a situation more clearly and to act more intelligently. We all know that success or failure of our medical work depend not only on the scientific knowledge we possess but also on a great variety of other non-medical factors, on economic, social, religious, philosophical, political factors that are the result of historical developments. Unless we are aware of them and understand them many of our efforts will be wasted.

An Institute of the History of Medicine in India will devote its researches primarily to the history of Indian medicine and of medicine in India, from the Vedic period to our days. It will investigate the medical heritage of the country dispassionately and critically, not in order to prove a point. It will endeavor to reconstruct and envisage the medical past of India from the perspective of history, in relation to and as part of the general civilization of the various periods.

In order to be able to write history the historian must first proceed analytically investigating and interpreting historical sources which in many cases have to be made available first. The chief medico-historical sources are texts and the Indian medical literature still requires a great deal of purely philological work. Many texts still have to be edited critically and many have to be translated. One of the most important Sanskrit medical classics, Vāgbhaṭa's Aṣṭāngahrdayasaṃhita was translated only a few years ago. I am convinced that there are still many medical texts buried in manuscripts that have not yet been touched. Our Johns Hopkins Institute possesses a collection of Sinhalese medical manuscripts written on palm leaves that have not been edited and therefore have obviously never been translated or evaluated.

The study of texts will not be limited to books written in Sanskrit, Prakrit or Pali but will be extended to Arabic and Persian books and to those written in vernacular languages. Sources of medical history, however, are not only medical books. Other books, religious, theological, philosophical, and histories, biographies, memoirs, etc. may contain valuable information concerning health and medical conditions at a given time. It will, therefore, be necessary to canvass the entire Indian litera-

ture for medical data. Dr. D. V. S. Reddy of Andhra Medical College in Vizagapatam has shown how the Rock Edicts of Aśoka are a rich source for our knowledge of medical conditions at the height of the Maurya empire. There can be no doubt that such books as the Ain-i Akbari and the autobiographies of the Mogul emperors contain a great deal that is of medical interest.

Books, however, are not the only sources of medical history. The antiquities, sculptures, paintings, buildings, instruments and other objects of archaeological research may be able to shed light on health and medical conditions and must therefore be consulted. The elaborate bathing facilities in Mogul palaces were a luxury, to be sure, but also had hygienic consequences and it mattered a great deal what kind of drinking water people had available and how they disposed of their sewage.

In a country like India where traditions have persisted tenaciously through the centuries and where the Middle Ages are still alive in many ways, the medical folklore is another rich historical source that must be consulted. This, however, must be done cautiously and critically because folklore always is a big hodgepodge in which ancient, mediaeval and modern views are inextricably mixed.

The Institute will not limit its studies to India because India was never isolated from the rest of the world. The Aryan conquerors came from the northwest and brought views and concepts that belonged to the common stock of all Indo-European races. Babylonian civilization radiated far over Asia, and India had intercourse with China at an early date. The caravan was a factor that greatly contributed to the spreading of stories, ideas, knowledge and skills all over the continent. Invading armies invariably had surgeons who brought knowledge to foreign lands and learned from them. The influence of Alexander the Great's campaign is reflected not only in the sculptures of Gandhara but in many ways, and Indian drugs were sold in Alexandria. The close relations of India with the Islamic world need not be emphasized here and from the 16th century on India had inter-relationships with Europe. The Institute therefore will study the history of Indian medicine as part of the universal history of medicine.

The critical evaluation of historical sources permits us to reconstruct the past. In the case of medicine it permits us to ascertain—if sufficient sources are available—what diseases afflicted the people in various periods, how their lives were affected by them, what they did to maintain and restore their health and what thoughts were guiding their actions.

The history of medicine differs basically from most other historical

disciplines that examine happenings and phenomena which occurred once, because it is the history of a craft, of techniques and skills. We therefore want to know not only what people did in the past to maintain and restore their health, but also whether they did a good job or not, whether their treatments were effective or not. This is why historians of medicine must not only be historians but physicians as well. Ancient treatments can be repeated, the efficacy of drugs can be tested in experiments.

The Institute will therefore investigate the indigenous medical systems not only for their ideological content, not only as aspects of India's ancient and mediaeval civilizations and as end products of a long development; it will also endeavor to evaluate their practical achievements. This obviously does not mean that the historical institute should have a laboratory for the testing of drugs. Certainly not, but the historian of medicine on the basis of his studies of the classical literature and of field work would be able to point out which treatments and drugs should be tested by the pharmacologists and clinicians of the College. This would permit us to preserve and to incorporate into our scientific system of medicine whatever is found to be of value in the indigenous systems. And it would also permit the objective refutation of claims that are not justified.

Thus the Institute, besides being a humanistic center, would also have some practical functions that could be extended in many directions. A physician can cure an individual case of syphilis without any knowledge of history, but whoever plans a campaign against venereal diseases must take a great many non-medical factors into account and will be confronted with social, economic and religious conditions that are the result of historical developments of which he should be aware. Health education is wasted unless it is somehow combined with education in citizenship which is impossible without history. I should think that at the present moment when India is planning to develop its medical services and to bring health to the villages, the cooperation of a physician who can think in terms of history, should be extremely valuable. And the Institute by collaborating with the departments of social medicine, hygiene and public health should be able to make important contributions.

IV.

There is another field in which the Institute of the History of Medicine as a department of a National Medical College could render great services, the field of education. It could greatly enrich the curriculum.

Whenever a country adopts scientific medicine it usually does it with

great enthusiasm and is inclined to throw everything overboard that is not science. The result is that physicians are produced who are highly trained technicians without any education, high grade specialists who see only one small section of medicine and have lost sight of the goal. Medicine is not a natural but a social science. Its target is to keep men adjusted to their social and physical environment as useful members of society, and to readjust them when prevention has broken down. Methods of the natural sciences have to be applied to this end, but the goal is social and the physician should always keep this broad purpose in view.

If I am correctly informed, the general education of the average medical student in India—as in many other countries—is rather scanty. From the moment he leaves the secondary school his training is along scientific lines. He has the added handicap that he is instructed in a foreign language—by necessity in view of the diversity of Indian languages. He may be familiar with English literature from Chaucer to Kipling and hardly know his own classics. I met Indians who admitted that they would find it difficult to deliver a lecture in their own Urdu or Bengali or whatever their mother tongue may have been. This peculiar situation obviously tends to divorce the small educated upper class from the mass of the people. But if there is one profession that must be close to the people it certainly is the medical profession, because the doctor must not only be a therapist but a teacher and friend of the people he serves.

Instruction in medical history, if properly conducted, could greatly contribute to the training of an educated physician. It would teach the student history, the history of his own country but also the history of the world with a bias on medicine that would bring the subject much closer to him. It would teach him to look at modern medicine from the perspective of history and to see it in all its economic, social, religious and philosophic implications, as the result of a long development, as a dynamic process. He would soon find that scientific medicine has a philosophy also. We too look at the human body as a microcosm in the midst of the macrocosm. The same elements that constitute the organism are found in the outside world, and the same physico-chemical forces are acting in both. The physician thus trained would have a much clearer idea of the task of medicine and of the part he is called upon to play in society.

Such instruction would also help to develop the spirit that must animate the physician in his work. He must realize that medicine is not a means of becoming rich but a service to the people. The same splendid spirit that drove an elite of medical students to volunteer their services during the recent Bengal famine must permeate the entire medical corps at all

times. Only in such a way will it be possible to carry out an ambitious program and to bring health to the villages.

The Johns Hopkins School of Medicine is often looked upon as the example of a school that succeeded in creating a new pattern of medical education in its country by raising entrance requirements and emphasizing scientific instruction in the laboratory and at the bedside of patients. This is correct but one should also remember that the men who made the School famous were not only great scientists but humanists also. Osler, Welch, Kelly, Halsted were keenly interested in the history of medicine and never missed an opportunity to impart historical knowledge to their students. In 1890, one year after the opening of the Hospital, three years before the School opened its doors, they founded the Johns Hopkins Medical History Club which is today in the fifty-fifth year of its activities. Osler's historical and philosophical essays will remain a source of inspiration long after his scientific papers and his textbook are forgotten. When the School was opened in 1893 the new curriculum included a course in the history of medicine that was given by John Billings, one of the great pioneers of American medicine, who drew up the plans for the Hopkins Hospital and was largely responsible for the new curriculum. And at the end of his career William Welch, in 1929, created the Johns Hopkins Institute of the History of Medicine, the first of its kind in the United States. I think these facts are highly significant and provide food for reflection.

V.

After all that has been said, it is easily apparent what the structure of such an institute must be. It will require personnel and equipment. Since it will not be possible to find a physician well trained in methods of historical research who masters equally well Sanskrit, Greek, Arabic and Persian, the Institute will need a staff of at least three scholars who will work as a cooperative group. One of them, a student of Sanskrit and other Indian languages will specialize on Hindu medicine. The second will devote his researches primarily to the Moslem phase of Indian medicine and will therefore be an expert in Arabic and Persian medicine, while the third will be a general medical historian and will study the history of Western medicine in its relations with the East and the rise of scientific medicine.

The staff will require tools for research, that is, collections and among them primarily a collection of books. The library of the Institute will include the basic medico-historical literature—books and journals—medi-

cal texts in the best editions and translations available, and as many reference books as possible. It should also include a number of non-medical books, such as basic books on political, social and economic history, the history of philosophy, religion and other disciplines, books that are constantly needed for general orientation.

The Institute will in addition collect other documents pertaining to the medical history of India, manuscripts, photographs, portraits, objects such as instruments, etc. and it may consider the creation of a museum of indigenous drugs.

Whoever organizes such an Institute today must endeavor to relieve the research and teaching staff of administrative burdens as much as possible. University administration is in many countries the most wasteful and cumbersome of all administrations in that it uses highly trained scientists and scholars for the solution of petty administrative problems that could be handled by general office workers just as well if not better, and this greatly reduces the efficiency of a faculty. The National Medical College will obviously have a strong Medical Library and it would be advisable to build the Institute of the History of Medicine in connection with or as an annex to the Library, so that the technical administration of the Institute could be handled by special employees of the Library. This would permit the staff of the Institute to devote all their efforts to research and the teaching of students.

This is not the place to discuss matters of budget, but there can be no doubt that the cost of erecting and operating such an Institute would be much smaller than that of any other department of the College. And the returns could be immeasurably great, to the College and to the country.

HIPPOCRATIC AND GALENIC CONCEPTS OF METABOLISM

C.-E. A. WINSLOW AND R. R. BELLINGER*

The process of metabolism is central in modern physiology. The reaction between the materials absorbed through alimentation and the oxygen taken in through respiration to liberate energy is the basic phenomenon of life. All other physiological processes may be considered as ancillary to this fundamental one. It seemed, therefore, of some interest to analyze the theories of early medical authorities in regard to the various elements of the problem, and to see how much they knew—or guessed—in regard to them. Our analysis is based primarily on the Hippocratic corpus and on the writings of Galen.[1]

Beginning with the alimentary aspects of the problem, we must, of course, recognize that food serves two more or less sharply differentiated needs of the body; the need for specific building materials essential for the construction and repair of body tissues and the need for oxidizable material to provide the energy for life and growth. The first of these requirements is only indirectly connected with metabolism; but the views of the ancients with regard to this aspect of the subject may be briefly summarized.

Heidel[2] points out that the Greeks quite generally regarded the cosmos as a living organism and conceived that both the microcosm and the macrocosm depended for their continued existence on the maintenance of a proper balance between receipt and expenditure, in a continuing process of waste and repair. Growth represented a surplus of receipts, decay a surplus of expenditures. The process was conceived as an addition or renewal of minute particles. Heidel believes that the physiological process of waste and repair was formulated not later than the beginning of the Sixth Century, B. C. (Alcmaeon). The assimilation of material was

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[1] We have chiefly used: *Hippocrates.* Loeb Classical Library. William Heinemann, London, and G. P. Putnam's, N. Y., Volume I (1923), II (1923), and IV (1931), translated by W. H. S. Jones; Volume III (1927), translated by E. T. Withington; and *Galeni Opera Omnia*, edited by C. G. Kuhn, 20 volumes, Lipsiae. C. Cnobloch, 1821-1833. References in the text, unless otherwise stated, are to volume and page of the above editions, preceded by "H" for Hippocrates, and "G" for Galen.

[2] Heidel, W. A. *Antecedents of Greek Corpuscular Theories.* Harvard Studies in Classical Philology. Harvard University, 1911, p. 111.

specific, involving the intake of many individual constituents required by the nutritive soul.

Thus, the Hippocratic essay on "Nutriment"[3] tells us that food "increases, strengthens, clothes with flesh, makes like, makes unlike, what is in the several parts, according to the nature of each part and its original power" (H. I, 343). In the "Regimen" we read; "Now the things that enter must contain all the parts. For that of which no part were present would not grow at all, whether the nutriment that were added were much or little" (H. IV, 241). Similarly, Galen says, "Every animal is nourished with food suited to it, and moreover, the suitable food for each is that which can be assimilated to the body which is nourished. Therefore, there must be a certain communion and likeness between the whole substance of the nutrient and the whole nature of the nourished" (G. I, 655).

The process of digestion, or preparation of the food for assimilation is also clearly recognized. "And it is quite plain that nutrition must be assimilation of the nutrient to that which is nourished" (G. II, 26). Nutrition occurs "when that which nourishes is changed and becomes like that which is nourished"; and "in each particle of an animal there is a certain faculty which, from its very action, we call in general altering, but specifically assimilating and nourishing" (G. II, 143). The heat of the body promotes the digestive process. "Plato appears to follow Hippocrates in this also, for he pronounces innate[4] heat to be the agent of the concoction[5] of foods in the stomach and of their distribution thence into the liver and veins, besides the production of blood and its transportation and concoction throughout the body" (G. V, 707). Here, and elsewhere, the blood is the agent by which food is carried to all parts of the body "and the substances both of all the viscera and also of the muscles are nourished from the blood itself" (G. II, 212). Similarly, the Hippocratic essay on "Nutriment" says: "Power of nutriment reaches to bone and to all parts of bone, to sinew, to vein, to artery, to muscle, to membrane, to flesh, fat, blood, phlegm, marrow, brain, spinal marrow, the intestines and all their parts; it reaches also to heat, breath and moisture" (H. I, 345).

The last few words of this citation carry us over from the concept of

[3] Certainly not by the author of "Airs, Waters, and Places"; shows marked Heraclitean influence; attributed by Jones to 400 B.C.

[4] Gr. ἔμφυτος, Lat. insitus (elsewhere the Latin is sometimes innatus or nativus; the Greek translated by "innate" is always ἔμφυτος).

[5] Gr. πέψις, Lat. concoctio.

food as a building-material to food as a source of energy. Throughout this essay, the word 'Power'[6] is used in relation to nutrition. "Power, one and not one, by which all these things and those of a different sort are managed; one for the life of whole and part, not one for the sensation of whole and part" (H. I, 355). This passage almost suggests our modern conception of unity of foods as energy sources and their specificity as building materials.

The concept of food as fuel for the body is much clearer in Galen, as indicated by the following passages: "Whatever in the blood is fatty, light, and tenuous, becomes in the warmer bodies a kind of fuel for the heat, in the colder it is stored . . . but in the parts warmer by nature such as the fleshy ones, it is taken up by the heat itself and carried off" (G. I, 606).

"All nutriment, as implied by the very word, increases the heat of the animal . . . and likewise it truly heats the body which it nourishes" (G. I, 660).

In discussing the function of fat in the body, Galen cites some authorities as saying that "the fatty juice within us cannot be produced unless the food be properly made over by nature, some admitting that it is contained in foods, but that it is used up by our heat as oil is by a flame, and that when it is made weaker it is accumulated in the body. There are some who bring animals, also, into the discussion, as those which are colder in nature, such as bears, sheep and pigs, are all found to be fatter; the warmer likewise both drier and slimmer and devoid of fat, as lions, leopards, dogs" (G. XI, 514).

"Since daily a large part of their substance flows away from all living things on account of innate heat, concoction is very necessary to their body, wherefore there is need of food and drink, that the just measure of heat may be preserved" (G. XV, 246).

"As the body is refrigerated in the lack of nourishment, so it is plain that it is heated by food. . . . [The parts of the body] are nourished by the warm humor of blood, whence it is that when food is digested[7] by the innate heat, it [the food] heats the body" (G. XV, 265).

"Now, in living things, foods which have not had time to be assimilated and nourish the body all seem to bring cold rather than heat immediately. But these also give heat after a passage of time like the other victuals if

[6] Gr. δύναμις.

[7] The Greek verb here is πέσσω, from which πέψις is derived; the Latin verb is concoquo, from which concoctio is derived; see Note 5.

only they are allowed to nourish the body. For all food by its nature increases the heat of the living thing" (G. XV, 289).

"After saying this, Sabinus then adds, 'What, therefore, is the oily substance? As oil nourishes an external fire, so the food of our nature, which is like fire, is the fat of cooked foods'" (G. XVII A, 745).

Galen obviously had a fairly accurate conception of the fact that foods (particularly fatty foods) were somehow transformed in the body in such a way as to produce heat; and that the process was analogous to the combustion of such substances outside the body. In one passage, it is even suggested that the need for such fuel is related to the constant loss of heat from the body.

In connection with the process of growth, needs for increased energy, as well as of building materials, are recognized. In the essay on "Ancient Medicine," the Hippocratic writer says, that from "such [foods] as can be assimilated will come nourishment, growth, and health" (H. I, 19). In "Nutriment," we read that "Power gives to all things increase, nourishment and birth" (H. I, 361); and that "Nourishment is sometimes into growth and being, sometimes into being only, as is the case with old men; sometimes in addition it is into strength" (H. I, 355). Galen, commenting on the saying of Hippocrates that growing things have an excess of innate heat, points out that boys grow because they have an excess of such heat—not that they become warm because they grow (G. XV, 155).

Even more interesting is the postulated relation between the need for fuel foods and muscular activity, bringing us almost to the threshold of quantitative metabolism. "Regimen I" says, "For food and exercise, while possessing opposite qualities, yet work together to produce health. For it is the nature of exercise to use up material, but of food and drink to make good deficiencies" (H. IV, 229). In "Regimen II," we are told that "Running exercises . . . have the power to heat, concoct and dissolve the flesh; they digest the power of the foods that is in the flesh" (H. IV, 353). In "Nutriment," a highly suggestive phrase is used in relation to food,—"It is a great thing successfully to adapt quantity to power" (H. I, 355). In "Aphorisms I," two phrases refer to the relation of food to age and growth. "XIII. Old men endure fasting most easily, then men of middle age, youths very badly, and worst of all children, especially those of a liveliness greater than the ordinary." "XIV. Growing creatures have most innate heat, and it is for this reason that they need most food, deprived of which their body pines away. Old men have little innate heat, and for this reason they need but little

fuel; much fuel puts it out. For this reason, too, the fevers of old men are less acute than others, for the body is cold" (H. IV, 105). In "Regimen in Health" are references to the influence of season: "In winter eat as much as possible" (H. IV, 45); and "Walking should be rapid in winter and slow in summer" (H. IV, 49).

Similarly, Galen, in discussing respiration says: "In excited motions the heat is increased while the animal spirit is used up; but when we rest and remain immobile the heat languishes while the spirit is used up either in no degree or quite moderately" (G. VII, 772).

Galen twice states that "the quantity of food must correspond in proportion to the quantity of perspiration" (G. XV, 240, and XV, 367), which is a suggestion of some interest.

With regard to the other phase of the metabolic process—related to the air which is to oxidize the food—Greek thinking was less clear. Something essential to life was clearly derived from the air; and it primarily affected the brain. In "The Sacred Disease," it is stated that "When a man draws breath into himself, the air first reaches the brain, and so is dispersed through the rest of the body" (H. II, 179). A most interesting passage is found in "Breaths." "Now bodies, of men and of animals generally, are nourished by three kinds of nourishment, and the names thereof are solid food, drink, and wind. Wind in bodies is called breath, outside bodies it is called air. It is the most powerful of all and in all, and it is worth while examining its power. A breeze is a flowing and a current of air. When, therefore, much air flows violently, trees are torn up by the roots through the forces of the wind, the sea swells into waves, and vessels of vast bulk are tossed about. Such, then, is the power that it has in these things, but it is invisible to sight, though visible to reason. For what can take place without it? In what is it not present? What does it not accompany? For everything between earth and heaven is full of wind. Wind is the cause of both winter and summer, becoming in winter thick and cold, and in summer gentle and calm. Nay, the progress of sun, moon, and stars is because of wind; for wind is food for fire, and without air fire could not live. Wherefore, too, air being thin causes the life of the sun to be eternal. Nay, it is clear that the sea, too, partakes of wind, for swimming creatures would not be able to live did they not partake of wind. Now, how could they partake except by inhaling the air of the water? In fact, the earth, too, is a base for air, and air is a vehicle of the earth, and there is nothing that is empty of air.

"How air, then, is strong in the case of wholes has been said; and for

mortals, too, this is the cause of life, and the cause of disease in the sick. So great is the need of wind for all bodies that while a man can be deprived of everything else, both food and drink, for two, three, or more days, and live, yet if the wind passages into the body be cut off he will die in a brief part of a day, showing that the greatest need for a body is wind. Moreover, all other activities of a man are intermittent, for life is full of changes; but breathing is continuous for all mortal creatures, inspiration and expiration being alternate" (H. II, 229-233).

In "Regimen II," a possible relation is suggested between respiration and exercise; "Early morning walks, too, reduce [the body] and render the parts about the head light, bright and of good hearing, while they relax the bowels. They reduce because the body, as it moves, grows hot, and the moisture is thinned and purged, partly by the breath, partly when the nose is blown and the throat cleared, partly being consumed by the heat of the soul for the nourishment thereof" (H. IV, 351-353).

Galen, in general, attributes a three-fold function to respiration: the cooling of the body, the removal of waste products, and the supply of special nutritive elements. The most comprehensive statement on these functions of respiration is, perhaps, the following: "This action [of the thorax] has been shown to be voluntary in the second book of the movements of the muscles; but the other, which is called pulse, is of the heart and arteries, by a dilation through the arteries' mouths which reach to the skin and which draw the outside air into the body for the sake of a triple use; refrigeration, ventilation, and generation of the animal spirit; but by contraction the arteries force out whatever is formed in them of sooty or smoky by the humors" (G. V, 708 f.). Another statement is as follows: Respiration "is composed of contrary motions separated by pauses, and it is for the sake of the same use; and of its parts inspiration, being quite similar to the diastole of the pulses, refrigerates the heat, while expiration, like the systole of the pulses, separates the smokelike excrement of combustion. And, moreover . . . both actions contribute to the nourishment of the animal spirit" (G. VII, 766 f.).

The cooling effect is emphasized by Galen more than the other two. In one place, he says, "Inspiration *cools* it [the heart] by bringing in the quality of coolness, while expiration pours out what boils therein and is, as it were, burned and sooty" (G. III, 412). (According to Heidel, the Atomists had a completely contrary view—that inspiration drew in fiery atoms and thus heated the body.) The process is apparently conceived by Galen as a sort of regulative process though the thinking here

is loose and confused. Respiration is described as a process for "conserving" native heat, apparently in the sense of controlling it.

The refrigerative function and the nutritive function are combined in the following passages: Respiration "preserves the moderation of the innate heat, and it nourishes the substance of the animal spirit" (G. IV, 466).

"What then is so useful to us in respiration? Is it the generation of the soul itself, as Asclepiades says? Or not the generation, but a certain strengthening, as Praxagoras the son of Nicarchus says? Or a certain refrigeration of the innate heat, as Philistion and Diocles declared? Or both nourishment and refrigeration, according to Hippocrates? Or do we breathe for none of these reasons, but for the sake of filling the arteries, as Erasistratus thinks?" (G. IV, 471). "The greatest and chiefest use of respiration is the conservation of innate heat; then there is also the nourishment of the animal spirit" (G. VII, 761).

The nutriment derived from respiration was apparently conceived as specifically different from that obtained through alimentation. The Hippocratic essay on "Nutriment" says, "The lungs draw a nourishment which is the opposite of that of the body, all other parts draw the same" (H. I, 353). Both, according to Heidel, were early conceived as strictly material in nature. He says; "That breath, both as inhaled and exhaled, was material and composed of minute particles; that food, in order to subserve its purpose, must be masticated or comminuted; that there were channels for the reception of breath and of food; and that both found their way somehow into the recesses of the body—these are observations which did not await the dawn of philosophy or of scientific medicine" (132).

Cooling and excretion of waste materials are emphasized as respiratory functions in various passages. The following sentence may be even taken as foreshadowing the concept of central nervous system control of body temperature. "Of course, with respiration as a whole produced by the brain for the sake of keeping the cardiac heat moderate, it is quite right that it [the brain] should provide this moderation first for itself, the organ by nature most susceptible to injury from extremes, whether of heat or of cold. How could nature fail to give it at birth a power of action against these extremes, to fan and throb during inspiration and to pour out at times the phlegm and mucus and catarrh during expiration?" (G. II, 884 f.). In Book III is an obscure description of the mechanism of respiratory excretion. "And certainly nature foresaw that there would of necessity be three other aids to the flow of food for the lung: the first, the supply of domestic heat, reducing and separating all the food into

small parts, that it might more readily turn to vapor; the second, the dilation of the lung during inspiration, violently tearing something out of even the densest organs; and the third, greatest of all, from that blood sent to the lung alone by the heart after being thoroughly treated and thinned there" (G. III, 452). Excretion from the lungs is specially emphasized in such passages as the following: "Since in the discussion of the use of respiration, it was shown that innate heat is cooled by the indrawn breath and as it were purged by the expelled breath as the sooty excrement is cleared out" (G. V, 161). Again, "in his discussion of the function of respiration Plato seems to imitate Hippocrates who considers inspiration to be for the sake of refrigerating the innate heat but expiration that the sooty refuse be poured forth and breathed out" (G. V, 713).

As in the case of alimentation, it is recognized that growth and exercise increase the need of respiratory exchange: "If the animal spirit is also nourished by respiration, on this account, too, boys breathe most and oftenest because as growers they need ampler nourishment. But if the sooty matter is mostly poured out in respiration, for this reason too they breath most and oftenest; for where there is more work on food, there also there is more excrement" (G. IV, 500). Again, "Since in the growing stages both for the strength of the innate heat and also for growth itself the greatest supply of humors is consumed, but in declining years only as much as is necessary to life itself (seeing that then men grow no further and already are cooling off); it is reasonable that the former should have rapid and great and thick expiration" (G. VII, 771).

As to activity, "You may observe that with those who exercise and bathe, and those who in any other manner are heated, not only does the respiration become faster and denser and greater, but the pulse is changed likewise" (G. V, 152).

In the process of waste and repair, as conceived by Greek philosophers (both for the microcosm and the macrocosm) is involved the interchange of moisture. The earth and the sea respired, now exhaling warm vapors and again receiving cooling showers. In the living body this process included both respiration and perspiration, according to Heidel.

The most outstanding advance—a unique approach to quantitative physiology—is that claimed for Erasistratus, in the Third Century, B. C. He is said [8] to have experimented with a respiration calorimeter, placing hens and other fowls in a jar, first feeding and weighing them; then,

[8] Heidel, 138.

after an interval of time, removing them and weighing them again with their visible excreta. The net loss of weight represented what was later called " insensible perspiration." According to this citation, Erasistratus anticipated Sanctorius, who is generally credited with this discovery, by nearly two thousand years!

In general, the treatment of respiration by Galen is much less satisfactory than his discussion of nutrition. The cooling effect of respiration is, of course, real, but relatively slight, compared to the heat loss from the body surfaces which the ancient writers practically ignored. We might read oxygen into the " food for the vital spirit " and carbon dioxide into the " sooty excrement "; but only by a long leap of the imagination.

The essential oxidative function of respiration is, however, clearly hinted at in comparisons with combustion, such as the following: " For bitumen, resin, tallow, oil, and pitch are hot in power, because they easily become hot in actuality and in fact they very quickly take fire: besides when they are applied to our bodies, they plainly give heat " (G. I, 649).

" I think they are most inclined to these ideas by the things that are evident about flames; for we plainly see the latter perish as quickly when deprived of air as living things; as medicinal cupping glasses show and all narrow and hollow objects which, when put over flames, prevent their breathing and easily extinguish them. If, therefore, it be discovered what flames in such situations undergo when they are extinguished, perhaps it will be possible to find also what use the heat in living things makes of respiration " (G. IV, 487). This is a really admirable piece of scientific reasoning. It shows how far physiological thinking had progressed, and how it was held up by the backwardness of chemistry.

Another suggestive passage is this one: " When I have seen that a furnace was put out because it had no respiration, and afterwards when it was opened it breathed out much soot and breathed in much of the pure outside air and from both actions the flame derived brightness, I have argued that the utility of expiration is not slight in that the soot, as it were, of the blood is evacuated. For ash and smoke and soot, and all superfluity of this sort of burned matter is wont, no less than water, to quench fire " (G. IV, 491 f.).

Again, " Where that which requires the use is greatest, there also it is not unreasonable for the use itself to be much increased, for a greater flame needs more abundant air, a smaller, less " (G. IV, 499). Again, respiration is cut off and the innate heat is extinguished from excess of cold matter " just as a flame is put out by much damp wood " (G. VII, 943).

The physicians of this classical period had in their hands many of the individual pieces of the picture puzzle of metabolism; but it was a millenium and a half before exact quantitative measurements and basic physical theories were available to make a sound physiological synthesis possible. Sanctorius, in 1614, took an important step. His *Ars de Statica Medicina* represents the first major contribution to experimental hygiene, a contribution ranking close to Harvey's pioneer work in experimental physiology. Sanctorius repeated and greatly expanded—with the human subject—the observations attributed to Erasistratus. He made careful measurements of "insensible perspiration" by comparing weight loss during a given period with the difference between weight of food intake and weight of bodily evacuations. He estimated this net loss by insensible perspiration at five pounds a day; and distinguished between the loss from the external skin and that from the upper respiratory tract (which latter he estimated at half a pound). He contrasted insensible perspiration, which he held to be beneficial, with sweating, which was considered harmful. He emphasized the importance of maintaining a reasonably constant weight; and advised eating such food and observing such a regimen as would establish a desirable mean loss of weight by insensible perspiration. All in all, Sanctorius had a logical and clear conception of metabolism on the basis of conservation of matter and of the essential correspondence between food intake, bodily activity and evaporative loss. His Aphorism XXXIII says, "If without the force of exercise the weight decreases, and the strength decays, it is because there is not a supply of nourishment in proportion sufficient to recruit what is wanted." His whole physiological theory was based on the use of the balance; and even when he speaks of the spirits being made "light" or "heavy," he is not using merely metaphorical terms. To have established biological experimentation on so frank a quantitative basis was no mean achievement for the Seventeenth Century.

To supplement conservation of matter by conservation of energy in human physiology required advances in chemistry not yet available. It is true that John Mayow, later in the Seventeenth Century, showed that dark venous blood was changed to a bright red color by some ingredient of the air. Yet, it was only in the late Eighteenth Century that advances in the chemistry of gases enabled Adair Crawford in England, and A.-L. Lavoisier and P.-S. Laplace in France, to work out the real nature of combustion and respiration. It was Lavoisier, in 1775, who really discovered oxygen, although Mayow, Priestley and Scheele had worked with it without recognizing its nature. The monograph by Lavoisier and

Laplace, " Mémoire sur la Chaleur " [9] is rightly described by Jacques Loeb as the foundation of scientific biology. Using an ice calorimeter, the great chemist and the great astronomer demonstrated for the first time, that combustion and respiration were essentially similar processes, both based on a chemical reaction between an active constituent making up about a quarter of the atmosphere (oxygen in our terminology) and some constituent of the burning substance or the respiring body. The authors conclude that " Respiration is then a combustion, of a very slow type, it is true, but otherwise entirely comparable with the burning of carbon; it takes place in the interior of the lungs, without producing observable light because the substance of the heat, when freed, is immediately absorbed by the humidity of the organs concerned; the heat developed in this combustion is communicated to the blood passing through the lungs and thence is distributed throughout the whole animal body. Thus, the air which we breathe serves two objectives, equally essential for our survival; it removes from the blood the basis of fixed air which in excess would be very harmful; and the heat which this chemical combination liberates in the lungs, makes good the continual loss of heat which we suffer to the atmosphere and to the surrounding bodies."

Here was—in essence—the whole story, so far as the respiratory aspect of metabolism was concerned. The other end of the chain, relating heat energy to food intake was made relatively simple by the advances in organic chemistry in the early Nineteenth Century. T. Schwann introduced the term " metabolic phenomena " in 1839; and Justus von Liebig, in 1842, published a full analysis of the concept of metabolism.[10] He sums the whole problem up in one sentence: " The reaction between the constituents of the food and oxygen circulating through the body in the blood is the source of animal heat."

Five years later, H. von Helmholtz announced the general principle of the conservation of energy, into which metabolism fits as a special case.

Finally, Max Rubner, in 1884, built the first successful respiration calorimeter on which (as perfected by W. O. Atwater and F. G. Benedict) our extensive modern knowledge of the problem is based.

[9] *Mémoires de l'Académie Royale* des Sciences, June 18, 1783, pp. 355-408.

[10] *Die Organische Chemie in ihrer Anwendung auf Physiologie und Pathologie.* Braunschweig. 1842.

THE SCHOOL OF SALERNO

Its Development and its Contribution to the History of Learning[1]

PAUL OSKAR KRISTELLER

The School of Salerno has been rightly famous as the earliest university of medieval Europe and as one of its first and most distinguished medical centers. Its contributions to medical knowledge and literature have been studied extensively by the students of medical history, and its institutional developments have been investigated, though less thoroughly, by the historians of the universities and by the students of local and regional history. Medical historians have rightly emphasized the unusual importance of the school during the eleventh, twelfth, and thirteenth centuries,[2] but they often seem almost to forget that in spite of its comparative decline the school continued to exist until 1812, and that it made its more or less modest contributions to medical literature up to the very end of its existence.

Historians of the universities have rightly noticed the obscurity of the institutional development of the school of Salerno in its early period, and have emphasized its failure to influence the organization of the younger universities, which were largely modeled on the example of Bologna and Paris.[3] On the other hand, they have neglected to study the later institutional development of Salerno, which is much less obscure, or to ask what influence the other and younger universities may have had on this later development of Salerno, and what influence early Salerno may have exercised on the younger universities, if not in their basic organization, at least in other respects. Similarly, historians rightly seem to agree that the medical doctrine and teaching of early Salerno was pre-Scholastic in

[1] Most of the material used for this study I found in the library of the New York Academy of Medicine (NYAM). I should like to thank the director, Dr. Archibald Malloch, as well as Miss Gertrude L. Annan and the other staff members for the facilities granted me and for their advice. Books quoted without location are found in the Columbia University Library or its affiliated collections.

[2] A. Castiglioni, *A History of Medicine* (translated by E. B. Krumbhaar), New York, 1941. See also: G. Sarton, *Introduction to the History of Science*, Baltimore, 1927-31. L. Thorndike, *A History of Magic and Experimental Science*, I (New York, 1923), 731 ff.

[3] H. Denifle, *Die Universitäten des Mittelalters bis 1400*, Berlin, 1885. H. Rashdall, *The Universities of Europe in the Middle Ages*, 2nd ed., by F. M. Powicke and A. B. Emden, I (Oxford, 1936), 75-86. S. D'Irsay, *Histoire des Universités françaises et étrangères*, I (Paris, 1933), 102-10.

its origin and character, whatever that may mean, but they seldom ask whether Salerno at a later stage was affected by Scholasticism in any significant way, or whether the Salerno school itself may have made some contribution to the rise of Scholasticism. Finally, there is no doubt that Salerno originated as a medical school and that medicine continued to remain the main subject of its studies up to the very end. But it is equally certain that subjects other than medicine, and especially philosophy, were taught at Salerno in the later period, and hence we may very well ask how extensive and important this teaching was, and what contributions the school of Salerno made to the development of non-medical and especially of philosophical studies. This point is of particular interest in view of the close connection between philosophy and medicine which characterized the other, younger Italian universities.[4]

It will be the task of the following discussion to emphasize these neglected aspects of the history of the Salerno school, rather than to repeat the well known facts about the medical literature connected with Salerno, facts that can be found in any history of medicine. Moreover, we shall have to pay much attention to certain questions concerning the chronology and institutional development of the Salerno school. For the history of the school of Salerno is filled with legends of old and recent making, and we shall have to examine and to correct them quite carefully if we want to understand the development of the school in its proper perspective. Even recent scholars have been too much inclined to take testimonies of a later period as direct evidence for a much earlier period, or to consider hypothetical combinations which are at best possible as though they were proven facts.

The history of the school of Salerno was first written in the seventeenth century by Antonio Mazza, who was completely uncritical but as Prior of the Collegium Medicorum of Salerno was well acquainted with local sources and traditions.[5] He was followed in the eighteenth century by Ackermann.[6] Their works were entirely superseded around the middle of the last century through the extensive publications of Salvatore De Renzi who, with the collaboration of Daremberg and Henschel, made

[4] The work of R. O. Moon (*The Relation of Medicine to Philosophy*, New York, 1909, NYAM) does not give what its title promises. It is merely a popular history of medicine.

[5] A. Mazza, *Urbis Salernitanae Historia et Antiquitates*, Naples, 1681. I have used the second edition, in I. G. Graevius, *Thesaurus Antiquitatum et Historiarum Italiae*, IX, pt. 4, Leiden, 1723 (New York Public Library).

[6] *Regimen Sanitatis Salerni sive Scholae Salernitanae de conservanda bona valetudine praecepta*, ed. Jo. Chr. G. Ackermann (Stendal, 1790), 1-92 (NYAM).

available a vast amount of new materials. In his *Collectio Salernitana* he published numerous medical texts of the school of Salerno, many of which were taken from the famous Breslau Codex discovered by Henschel.[7] At the same time De Renzi collected from the various archives in Southern Italy many documents illustrating the biographies of the Salerno doctors and the institutional development of the school, and based on them his detailed history of the school of Salerno, first published in the first volume of the *Collectio Salernitana* and then reprinted, with numerous additions and corrections, as a separate volume.[8] The wealth of the material offered by De Renzi compensates for his lack of critical judgment, and in spite of their obvious deficiencies, his works have remained the foundation for any subsequent study of the Salerno school. They have been corrected and supplemented on many important points, but they have not been superseded.

After De Renzi's works, researches on the Salerno school have taken two entirely separate lines. On the one hand, knowledge of the medical literature connected with Salerno has been increased through the publication of new texts, and through a critical examination and evaluation of the texts published by De Renzi. The main work in this direction has been done by Giacosa,[9] and especially by Sudhoff and his school.[10] To Sudhoff we owe not only the publication of many texts and numerous critical studies concerning the medical literature of Salerno, but also the best recent summary of the history of Salerno as a medical center.[11]

[7] *Collectio Salernitana*, ed. S. De Renzi, 5 vols. Naples, 1852-59. On the Breslau Codex see: F. Hartmann, *Die Literatur von Früh- und Hochsalerno*, diss., Borna-Leipzig, 1919 (NYAM); K. Sudhoff, "Die Salernitaner Handschrift in Breslau," *Archiv für Geschichte der Medizin*, XII (1920), 101-48 (NYAM).

[8] *Storia della Scuola Medica di Salerno*, in *Coll. Sal.* I (1852), 1-416. Several additions are scattered in volumes II through V. *Storia documentata della Scuola Medica di Salerno*, 2nd ed., Naples, 1857 (Army Medical Library).

[9] P. Giacosa, *Magistri Salernitani nondum editi*, Turin, 1900 (NYAM). The volume contains several medical texts from Salerno, and a catalogue of manuscripts and documents exhibited at Turin in 1898. Some of the manuscripts contain material concerning Salerno, but none of the documents does.

[10] For the contributions of Sudhoff and his pupils see: H. E. Sigerist, "Bibliographie der medizingeschichtlichen Arbeiten von Karl Sudhoff," *Essays on the History of Medicine presented to Karl Sudhoff* (Zurich, 1924), 397-8. G. Herbrand-Hochmuth, "Systematisches Verzeichnis der Arbeiten Karl Sudhoffs," *Sudhoffs Archiv für Geschichte der Medizin*, XXVII (1934), 143-6 (NYAM).

[11] Th. Meyer-Steinegg and K. Sudhoff, *Geschichte der Medizin im Überblick*, 3rd ed. (Jena, 1928), 175-203 (NYAM). Sudhoff, "Salerno, eine mittelalterliche Heil- und Lehrstelle am Tyrrhenischen Meere," *Archiv für Geschichte der Medizin*, XXI (1929), 43-62. In the English version of this article several interesting details have been omitted

Among the pupils of Sudhoff, Creutz in particular has recently contributed several text editions and monographical studies.[12] Primarily with the medical literature of Salerno are also concerned the studies of Handerson, Packard, Corner, and Singer.[13] On the other hand, a number of publications have made available new documents concerning the teachers and institutions of the school of Salerno. For the earlier period up to the fourteenth century we must mention the studies of Garufi, Capparoni, and Carucci, for the later period those of Settembrini, Del Gaizo, Sinno, and again of Capparoni.[14] On the whole, it may be said that much of the medical literature of the Salerno school has been published and critically

(K. Sudhoff, *Essays in the History of Medicine*, ed. F. H. Garrison, New York, 1926, 227-47).

[12] See below.

[13] H. E. Handerson, *The School of Salernum*, New York, 1883. F. R. Packard, "History of the School of Salernum," in *The School of Salernum, Regimen Sanitatis Salernitanum, The English Version by Sir John Harington* (New York, 1920), 7-52 (NYAM). G. W. Corner, "The Rise of Medicine at Salerno in the Twelfth Century," *Annals of Medical History*, N. S. III (1931), 1-16 (NYAM). Charles and Dorothy Singer, "The Origin of the Medical School of Salerno, the First University, An Attempted Reconstruction," in *Essays on the History of Medicine Presented to Karl Sudhoff*, 121-38. The same, "The School of Salerno," *History*, N. S. X (1925-6), 242-6 (reprinted in: Ch. Singer, *From Magic to Science*, London, 1928, 240-8, NYAM). Ch. Singer, "A Review of the Medical Literature of the Dark Ages," *Proceedings of the Royal Society of Medicine*, X (1916-7), *Section of the History of Medicine*, 107-17 (NYAM). See also Sir T. Clifford Allbutt, *Greek Medicine in Rome* (London, 1921), 425-41.

[14] *Necrologio del Liber Confratrum di S. Matteo di Salerno*, ed. C. A. Garufi (*Fonti per la Storia d'Italia*), Rome, 1922. P. Capparoni, *Magistri Salernitani nondum cogniti* (*Welcome Historical Medical Museum, Research Studies*, No. 2), London, 1923 (NYAM). An Italian edition of the same work was published under the same title, Terni, 1924 (NYAM), and in the *Bollettino dell'Istituto Storico Italiano dell'Arte Sanitaria*, IV (Supplement to the *Rassegna di Clinica, Terapia e Scienze Affini*, XXIII), 1924, 1-19; 70-89 (NYAM). The greater part of the material collected by Capparoni is from the *Necrologio* which he used in the manuscript before it was published by Garufi. *Codice Diplomatico Salernitano del secolo XIII*, ed. C. Carucci (*Fonti per la Storia d'Italia*), I (1201-81), Subiaco, 1931 (New York Public Library). L. Settembrini, "Le Carte della Scuola di Salerno," *Nuova Antologia*, XXVI (1874), 942-9. M. Del Gaizo, "La Scuola medica di Salerno studiata nella storia e nelle leggende," *Atti della Accademia Pontaniana*, XXVI (Ser. 2 vol. 1), no. 2 (New York Museum of Natural History). The same, "Documenti inediti della Scuola Medica Salernitana," *Resoconto delle adunanze e dei lavori della Reale Accademia Medica-Chirurgica di Napoli*, XLI (1887), 191-223 (Library of Congress). A. Sinno, "Diplomi di laurea dell'Almo Collegio Salernitano," *Archivio Storico della Provincia di Salerno*, I (1921), 211-51; id., "Vita scolastica dell' Almo Collegio Salernitano," *ibid.*, II (1922), 38-74; id., "Cronologia dei Priori dell'Almo Collegio Salernitano," *ibid.*, 274-307 (Yale University Library). P. Capparoni, "Diplomi di laurea dello Studio Salernitano," *Rivista di storia critica delle scienze mediche e naturali*, vol. III (anno 1916), 65-74 (Library of the Institute of the History of Medicine, The Johns Hopkins University, Baltimore).

evaluated, but that the attention of medical historians has been somewhat unduly focussed on the Breslau Codex and on the *Regimen Sanitatis Salernitanum*, and that the Salernitan literature of the later period, after the middle of the thirteenth century, has been very much neglected and may become much better known in the future through further manuscript researches. On the other hand, valuable documents have been added to those known to De Renzi, but his historical statements have never been critically reexamined in the light of these new documents or even of those published by himself. Moreover, the two branches of study which deal respectively with the medical literature of Salerno and with the institutional development of its school have not been properly integrated since De Renzi.

This state of affairs, due to the recent trends of specialized scholarship, has also some roots in the condition of the source materials. The historical evidence represented by documents or by the reports of chronists seldom matches the literary evidence represented by extant texts attributed to certain authors, and these two types of materials must be properly distinguished. Still they must be brought together if we are to attain satisfactory historical knowledge. The names of physicians as found in contemporary documents or chronicles are of slight interest unless we know something of their scientific achievements, and the extant literary texts can hardly be utilized in a historical sense as long as their date and place of origin and their authorship are unknown. Only when extant literary works are reliably attributed to authors whose existence can be corroborated through contemporary documents do we forsake the realm of legend or hypothesis for that of established historical facts. Moreover, the very term " the School of Salerno " is full of ambiguities which have misled the judgment of many scholars. Aside from the " schola Salerni " which appears as the collective author of the " Regimen Sanitatis " and which has been rightly confined to the sphere of pure legend, we must distinguish between medical practice, practical instruction in medicine, medical literature, organized teaching of medicine, and finally a corporation or college of physicians organized under a president, conferring degrees and issuing diplomas. All of these meanings apply to various stages of the Salerno school, but they were not all present at the same time or from the beginning, and scholars have been much too prone to take the evidence for one of these meanings indiscriminately as a proof for the existence of the " school " in one of the other senses. We must keep in mind these distinctions if we are to give an accurate picture of the history of the school of Salerno.

The origin of the school of Salerno is admittedly obscure, and this is one of the few points on which scholars would now seem to agree. The legend that the school was founded by four masters, which Mazza took from the apocryphal Chronica Elini, has been rightly discarded [15] and the opinion that the school went back to ancient Roman times can likewise hardly be supported.[16] More recent scholars would trace the school back to the ninth century.[17] Available evidence, however, does not support such an early date. To be sure, the names of a few physicians occur in local documents of the ninth and tenth centuries,[18] but this does not distinguish Salerno from other Italian cities of the same period,[18a] nor would the occasional mention of doctors prove a local tradition of medical practice, let alone the existence of a medical school. More important is the testimony of the historian Richer of Reims. Richer, who wrote in the last decade of the tenth century, reports a curious incident between two physicians at the French court. Derold, who died as bishop of Amiens and was favored by the king, and a Salernitan doctor who was favored by the queen, held a debate on medical questions in which the Salernitan lost. The Salernitan then tried unsuccessfully to poison Derold, whereas the latter successfully poisoned the Salernitan, but generously cured and saved him before he actually died.[19] Sudhoff, who identifies the king with Charles III and hence assigns the incident to the early tenth century, would hence infer that the Salerno school existed during the late ninth century.[20] But Richer does not give the name of the king, nor that of the Salernitan doctor. Moreover, he mentions the incident not in its proper context, but

[15] Mazza, *op. cit.*, col. 64. The passage of the chronicle is given by De Renzi, *Coll. Sal.*, I, 106-9, note 3; *Storia documentata*, no. 17, p. XXVI ff. For the dubious character of the chronicle and of the story see De Renzi, *Coll. Sal.*, I, 106 ff. M. Steinschneider, "Donnolo," *Archiv für pathologische Anatomie und Physiologie und für klinische Medicin*, XXXVIII (1867), 80-89 (NYAM). Singer, "The Origin." The same, "The School of Salerno."

[16] The origin of the school in Roman times is suggested by De Renzi (*Coll. Sal.*, I, 130 f. *Storia documentata*, 141 ff.).

[17] Sudhoff, "Salerno," 44. Id., *Geschichte der Medizin*, 175.

[18] For the period before 985, four doctors are listed by De Renzi, the earliest appearing in a document of 848 (*Storia documentata*, 157 f.).

[18a] Many examples of physicians mentioned in early Italian documents are found in G. Salvioli, *L'istruzione in Italia prima del mille*, 2nd ed., Florence, 1912. They are especially frequent for Naples in the tenth century (*ibid.*, pp. 115 f.), which does not prove anything for the existence of the school of Salerno, but which does denote a flourishing of medical practice in Southern Italy.

[19] *Richeri Historiae*, Bk. II, ch. 59 (*Monumenta Germaniae Historica, Scriptores*, III, 1839, 600 f.).

[20] Sudhoff, "Salerno," 44 f. Id., *Geschichte der Medizin*, 175.

on the occasion of bishop Derold's death (947), and begins his story with the cautious words: "It is reported about him that. . . ." Finally, the whole content of the story is highly anecdotal, not to say fantastic, and hence can hardly be taken as a historical fact.[21] This is confirmed by what we know otherwise about Richer himself. He does not offer any first hand information for the period before 966, and he is known to have invented not only speeches and letters, but also many details and episodes. In particular "he describes the diseases of historical persons in order to display his medical learning, regardless of truth."[22] As a matter of fact, Richer tells us that he went to Chartres in 991 to study medicine under Erchembertus.[23] Hence we shall have to discount the Derold story as a historical fact of the early tenth century, but it remains an important testimony for Richer's own time, that is, for the end of the tenth century. Richer invents the episode to illustrate a situation which had arisen in his own time and which is obviously of great interest for himself: In opposition to the tradition of French clerical medicine in which Richer himself was trained and of which Derold is the representative in the story, there has now developed another center of medicine at Salerno. The episode is intended to illustrate the superiority of French clerical medicine over Salerno medicine, but Richer also tries to describe their characteristic difference: Derold is credited with learning, the Salernitan with personal genius and practical experience.[24] The fame of Salerno as a seat of successful medical practitioners thus had reached Northern France towards the end of the tenth century.

[21] De quo etiam fertur, Richer, *l. c.* The king who reigned at the time of Derold's death is Louis IV, and Richer adds that Derold was dear to him. The story is said to have happened when Derold "was still serving the king in the palace." Since Derold became bishop (929) before Louis IV became king (936), Sudhoff presumably concluded that the king in the story must have been Charles III, Louis' father, who reigned 898-929. But the identification remains arbitrary, since Richer apparently does not know the chronology of this time as well as modern historians, and since his story is an invention anyway.

[22] W. Wattenbach, *Deutschlands Geschichtsquellen im Mittelalter*, ed. R. Holtzmann, vol. I, pt. 2, Berlin, 1939, 297-300. The sentence quoted above is on p. 299.

[23] Richer, bk. IV, ch. 50 (*l. c.*, p. 642 f.). His study of medicine at Chartres was based on Hippocrates' *Aphorisms* and on a book entitled *De concordia Yppocratis, Galieni et Surani*. See K. Sudhoff, "Medizinischer Unterricht und seine Lehrbehelfe im frühen Mittelalter," *Sudhoffs Archiv für Geschichte der Medizin*, XXI (1929), 30 f. Id., *Geschichte der Medizin*, 172.

[24] Deroldus quidem utpote litterarum artibus eruditus probabiliter obiecta diffiniebat. Salernitanus vero licet nulla litterarum scientia praeditus, tamen ex ingenio naturae multam in rebus experientiam habebat (Richer, II, 59). Sudhoff ("Salerno," p. 46) explains: ". . . aus dem Geiste der Natur, der sie nahe geblieben waren, ziehen sie ihre ärztliche Erfahrung." Yet the words *ex ingenio naturae* refer to the mind of the Salernitan doctor, not to the universe of a modern scientist.

This is evident from another fact also. The anonymous chronist of the bishops of Verdun who wrote during the eleventh century reports that Bishop Adalbero II after his election (985) went to Salerno for medical treatment, but died soon afterwards (988).[25] This report was later repeated by the chronist Hugh of Flavigny, and we have no reason to doubt its correctness.[26]

Salerno thus appears from 985 on as a renowned center of medicine, and we may reasonably suppose that it had taken about ten or twenty years to develop that reputation. There is no evidence whatever that medicine flourished at Salerno before the middle of the tenth century; it is merely possible. The argument used by some historians that certain conditions which appear at a given time, but whose origin cannot be assigned to any specific year, must have existed at least a hundred years before or even since time immemorial, does not carry much weight. The second half of the tenth century may thus be considered as the date of origin of the school of Salerno. This date is early enough to maintain the traditional claim that Salerno was the first European university, and we also know that by that time Salerno had been for quite a while one of the main political and ecclesiastical centers of Southern Italy, a position it preserved far into, and beyond, the thirteenth century.[27]

At the time of its origin during the second half of the tenth century, the school of Salerno was renowned for its practical skill and successful cures rather than for any learning, as we may conclude from Richer's report. It was a group of clever medical practitioners, and we may assume that they transmitted their observations and methods through some kind of practical instruction. But for that early period we know of no names of famous Salerno doctors, we have no medical literature con-

[25] *Gesta Episcoporum Virdunensium* (*Mon. Germ., Scriptores*, IV, 1841, 47). Adalbero was so sick, "ut ipso eodem anno benedictionis suae Salerniam causa salutis exposceret nostris secum comitatis. Qui cum ibi moraretur et a medicis curari non posset reversus est Italiam," where he died. The chronist seems to consider *Salernia* as a country different from *Italia*. On the anonymous chronist see Wattenbach-Holtzmann, I, pt. 2, p. 193. He was a monk of Verdun and wrote in the middle of the eleventh century.

[26] *Chronicon Hugonis* (*Mon. Germ., Scriptores*, VIII, 1848, 367). "Is (i.e. Adalbero) Salernum eodem anno benedictionis suae curationis gratia profectus, reversus in Italia obiit. . . ." Hugo wrote toward the end of the eleventh century (Wattenbach, 6th ed., II, 1894, 134-6) and obviously follows the anonymous author of the Verdun chronicle.

[27] Salerno was the capital of an independent Lombard principality after 847, and the capital of the Norman duchy of Apulia and Calabria after 1075. After 1127 the capital of the kingdom was moved to Palermo, but Salerno remained the chief city of the continental part of the kingdom. Naples became the capital only under Charles of Anjou (after 1266). Salerno was also the seat of a bishop, and since 982 of an archbishop.

nected with Salerno, no evidence of organized theoretical instruction, or of any organized guild or corporation comprising the various physicians.[28] All these things obviously came with later developments. Moreover, the much-debated question whether the school of Salerno was ecclesiastic or secular in its origin can hardly be decided on the basis of available evidence. Since there is no trace of any organization at that time, the question would merely concern the status of the individual doctors. The documents show that many of them were clerics, but we certainly cannot prove that all of them were.[29]

During the eleventh century, the fame of Salerno as a center of medical practice continued. The poet Alfanus says of this period that medicine flourished in Salerno,[30] and we learn from the chronists that Desiderius, the abbot of Montecassino, went to Salerno for medical treatment,[31] and that Adalbert, archbishop of Bremen, was attended by Adamatus, a physician from Salerno.[32] But the eleventh century also marks an important progress in the development of Salerno. The first traces of medical literature appear, and they suggest the beginnings of a more methodical and theoretical instruction. Unfortunately, this first period of Salernitan

[28] The assumption that the Salerno doctors were a group rests on the words of the chronists reporting the Adalbero episode, see above, notes 25 and 26. The statement that the doctors were organized in a kind of guild is consistently repeated by most historians, but has no foundation in the sources.

[29] The lay origin of the Salerno school has been emphasized by De Renzi and Sudhoff. Their arguments merely prove that the school in its later development had a lay character. On the other hand, the arguments used to prove the origin of the school in the Benedictine monasteries of Salerno and Montecassino are not convincing either (see especially, for this point of view, F. Puccinotti, *Storia della medicina*, vol. II, pt. 1, Leghorn, 1855, 251 ff. NYAM). I agree with the cautious statement of Denifle, p. 232 ff. In the early documents, many Salerno doctors are called *clerici*. Later the number of clerical doctors decreases. The development must be explained by the prohibition of the study and practice of medicine (and civil law) for monks and regular canons, which was formulated by the Church Councils of the twelfth century and later extended to the whole clergy (Capparoni, *Magistri*, pp. 19 f. and 53 ff. See also L. Dubreuil-Chambardel, *Les médecins dans l'Ouest de la France aux XI^e et XII^e siècles*, Paris, 1914, 174-95. NYAM). In the later history of the Salerno school, no connection with the pope, the archbishop, or any monasteries is apparent. The names of the archbishops Alphanus I (eleventh century) and Romualdus II Guarna (twelfth century) appear in some connection with the medical school, but this connection is vague and dubious. After the middle of the sixteenth century, the Salerno school submitted to a number of religious requirements, but they were introduced by voluntary decision or by an order of the political rather than the ecclesiastical authorities.

[30] De Renzi, *Coll. Sal.*, I, 121.

[31] *Ibid.*

[32] *Monum. Germ., Scriptores*, VII (1846), 362. Sudhoff, *Geschichte der Medizin*, p. 173. The passage is not found in the main text of Adam of Bremen, but in one of the scholia added to it afterwards.

literature is very obscure, and the date and authorship of most of the texts are highly controversial.

The earliest medical writer whose name appears in connection with Salerno is Gariopontus or Guarimpotus. He is mentioned as an older contemporary by Peter Damiani, and is given as the author of a treatise on fevers, and especially of a *Passionarius* which was also often quoted as a work of Galen.[83] Sudhoff doubts that the physician mentioned by Peter Damiani had any connection with Salerno, or even with the *Passionarius* current under his name, since the latter work shows the characteristics of earlier medieval medical literature, being nothing but a compilation from late ancient sources.[84] But the name Guarimpotus appears repeatedly in the Salerno documents of the period,[85] and the *Passionarius*, although often attributed to Galen, appears as the work of Gariopontus in at least three manuscripts, one of which may still belong to the eleventh century, and is quoted as such by Simon of Genoa around 1300. That the work was actually compiled from writings of Galen and other ancient medical authors appears even from the mss. titles, and was known to Simon of Genoa.[86] If the work actually resembles earlier medieval literature of that type, this would merely indicate that Salernitan medicine at that time continued the tradition of "monkish medicine" and had not yet advanced beyond it so far as has often been assumed.

Another medical work assigned to early Salerno is the so-called *Practica Petroncelli*. In this case not only doubts have been raised as to the date and place of origin, but we do not even know anything about the person of the supposed author. There is a Petrocellus, but he belongs to a much later period. It seems difficult to identify the author of the treatise with one Petrus who appears in the documents of the eleventh century.[87] Two other Salernitan works which in their extant form belong to the twelfth century are said by medical historians to go back in their original form to the eleventh century. One of them is the *Antidotarium Nicolai*, whose rather obscure author is said to have lived in the early twelfth century.[88] The other is the famous treatise on gynaecology current under the name

[83] De Renzi, *Coll. Sal.*, I, 137 ff. Hartmann, 4 ff.
[84] Sudhoff, "Salerno," 48 f. *Geschichte der Medizin*, 169.
[85] Capparoni, *Magistri*, 39.
[86] De Renzi, *l. c.* Geyl, "Zwei lateinische Handschriften aus dem 11. Jahrhundert," *Janus*, XIV (1909), 161 f. (NYAM).
[87] Hartmann, p. 7. Sudhoff, *Geschichte der Medizin*, 179-81. Id., "Salerno," 50. De Renzi, *Storia documentata*, 163 ff.
[88] Sudhoff, "Salerno," 48 ff. *Geschichte der Medizin*, 178.

of Trotula.[39] On the other hand, the *Regimen Sanitatis Salernitanum*, long assigned to the same period, is now considered to belong to a considerably later time.[40]

The content of this literature seems to show much more interest in medical practice than in general theoretical principles. The obscurity of the authorship of these treatises, as well as the continual modification to which their text was subjected, would also reflect the accumulated experience of practising physicians. But the fact that these observations and prescriptions were written down obviously points to a developing tradition of medical instruction, which became increasingly theoretical and methodical. The use made of the remnants of ancient medical literature as well as of the anonymous prescriptions and cures of monkish medicine would show only that Salerno had now added learning to observation. But there is still no evidence of a regular university with appointed professors, registered students, a fixed curriculum, and degrees. Nor is there any evidence that the Salerno doctors at that time were organized as a guild or corporation. Occasionally we find references to the *socii* of a medical writer, but this does not indicate other members of a medical association, but simply, according to common medieval usage, his students.[41]

[39] De Renzi (*Coll. Sal.*, I, 149 ff.) considers Trotula, a woman doctor of the late eleventh century, as the author of the work. Her authorship and historical existence have been questioned by Sudhoff (*Geschichte der Medizin*, 199 f.) and Singer ("The Origin," 129), and again vigorously defended by Kate Campbell Hurd-Mead ("Trotula," *Isis*, XIV, 1930, 349-67). The latter article gives much material on the later tradition concerning Trotula, but does not decide the issue since the tradition is traced back to the thirteenth century only. More cautious and convincing is the recent article of H. P. Bayon ("Trotula and the Ladies of Salerno," *Proceedings of the Royal Society of Medicine*, XXXIII, 1930-40, 471-75. NYAM. I am indebted for this reference to Dr. Archibald Malloch, director of the library of the New York Academy of Medicine). The article of G. L. Hamilton ("Trotula," *Modern Philology*, IV, 1906-7, 377-80) has no bearing on the controversy. Women doctors who are interested in the history of their profession and regret to lose the distinguished example of Trotula, may take comfort in a few other examples from Salerno which are later, but better established. *Francisca uxor Mathei de Romana de Salerno* received a regular royal license to practice surgery in 1321 (De Renzi, *Storia documentata*, doc. 262, p. CXII), and other women received similar licenses in 1332 (*ibid.*, doc. 308, p. CXXIII). Costanza Calenda appears as a doctor in 1422 (*ibid.*, doc. 338, p. CXXX). See also Muriel J. Hughes, *Women Healers in Medieval Life and Literature*, New York, 1943.

[40] See below.

[41] *Gariopontus quidam Salernitanus eiusque socii* are mentioned in the title of the *Passionarius* in the Basel manuscript (*De Renzi, Coll. Sal.*, I, 139). De Renzi concludes from this expression that it was the custom of the Salernitan masters to write works in common (*Ibid.*, 139 f.), and elsewhere he uses the same expression to prove the early existence of a medical guild or *collegium* at Salerno (*Storia documentata*, 386). Puccinotti translates *socii* as monks and thus uses the expression as a proof for his theory of

Before the end of the eleventh century, we come across two more medical writers who are tangible historical persons and who also lived for some time in the city of Salerno. But there is no evidence that they ever taught medicine at Salerno or had any connection with its medical school. However, since they had some influence on the later development of the Salerno school, we must include them in our treatment. I am referring to Alfano and to Constantine the African.

Alphanus of Salerno, who was a monk at Montecassino and long archbishop of Salerno (1058-85), is well known in the history of medieval literature for his Latin poems.[42] His biographers also credit him with considerable medical knowledge which he must have acquired at Salerno, and recently a group of medical and scientific writings have been brought to light which are at least persistently associated with his name, if not actually composed by him. The first of these works, entitled *Premnon physicon seu Stipes naturalium*, has been shown to be a Latin version of Nemesius of Emesa's treatise *On the Nature of Man*, which in the Middle Ages often went under the name of Gregory of Nyssa. Since the work contains a considerable amount of Greek philosophical and medical lore, its translation was at that time certainly a valuable addition to the scanty Latin literature on those subjects. Alfanus' version, which was later followed by another by Burgundio Pisanus, attained a certain diffusion, as the number of extant manuscripts shows, but its fortune and influence should be further investigated. There seems to be no visible trace of it in later Salernitan literature.[43] The second scientific work attributed to Alphanus is a treatise *De quattuor humoribus*, recently published by Capparoni. According to the editor, the text does not represent the original work of Alphanus, but rather a later revision made by a medical student

the ecclesiastical origin of the Salerno school (*Op. cit.*, 255 and 286). Yet at Bologna and other universities the students were quite commonly called *socii* in relation to their professors (Denifle, p. 152). The same terminology was also used at Salerno. Magister Salernus in the preface of his *Compendium* addresses his *socii dilectissimi*, and proceeds: "Utile et enim est turba sociorum decorari, honestum est eorum utilitate clarescere" (De Renzi, *Coll. Sal.*, V, 201). Other examples will be given below.

[42] M. Manitius, *Geschichte der lateinischen Literatur des Mittelalters*, pt. II, Munich, 1923, 618-37. G. Falco, "Un vescovo poeta del secolo XI, Alfano di Salerno," *Archivio della Società Romana di Storia Patria*, XXXV (1912), 439-81. Creutz, see below.

[43] Manitius, *Op. cit.* C. Baeumker, "Die Übersetzung des Alfanus von Nemesius περὶ φύσεως ἀνθρώπου," *Wochenschrift für klassische Philologie*, XIII (1896), coll. 1095-1102. The translation was published in a critical edition by C. Burkhard (*Nemesii episcopi Premnon physicon . . . a N. Alfano archiepiscopo Salerni translatus*, Leipzig, 1917. I have not seen this edition).

and based on the lost original.[44] The fact that Alphanus should have written on the four humors would be rather interesting, because among all the medical notions transmitted to early Salerno from late antiquity, this theory of the four humors had definite philosophical implications and was in fact increasingly developed by the Salernitan authors. The third medical treatise attributed to Alphanus is entitled *De pulsibus* and has been recently published by Creutz and by Capparoni. Again the extant form of the treatise cannot be the original work of Alphanus, since the anonymous author in his preface merely mentions Alphanus among his sources. Instead of eliminating this part of the preface as a later interpolation, as Capparoni proposes, it seems much sounder to consider with Creutz the whole work as a later treatise based on a lost work of Alphanus. The situation thus would be the same as in the case of the other treatise *De quatuor humoribus*.[45] The two last-mentioned treatises would merely indicate that at Salerno in the twelfth century certain medical texts were current under the name of archbishop Alphanus, and that they might very well have been based on original works of that author

[44] P. Capparoni, *Il "De Quattuor humoribus corporis humani" di Alfano I Arcivescovo di Salerno*, Rome, 1928 (NYAM). Id., "Il trattato 'De quattuor humoribus' di Alfano I, Arcivescovo di Salerno," *Casinensia*, I (1929), 151-56 (New York Public Library). R. Creutz ("Erzbischof Alfanus I., ein frühsalernitanischer Arzt," *Studien und Mitteilungen zur Geschichte des Benediktiner-Ordens und seiner Zweige*, N.F., XVI, 1929, 413-32. New York Public Library) republished an anonymous fragment *De quatuor humoribus ex quibus constat humanum corpus* (De Renzi, *Coll. Sal.*, II, 411 f.), attributing it to Alphanus for no other reason but the fact that Alphanus had been said to have written a treatise on that subject. After Capparoni published the different text which at least in the manuscript is attributed to Alphanus, Creutz corrected his mistake ("Nachtrag zu Erzbischof Alfanus I," *ibid.*, N.F., XVII, 1930, 205-8). In the meantime, Hermann Lehmann pointed out that the quotation *in libro septimo epodon*, found in the anonymous treatise, must refer to the Greek version of Constantine the African's *Viaticus*, which is entitled *Ephodia* ("Zu Constantinus Africanus," *Sudhoffs Archiv für Geschichte der Medizin*, XXIV, 1931, 263-8). Yet taking the attribution to Alphanus for granted, Lehmann considered the passage as contemporary evidence for the existence of the Greek version as well as for Constantine's authorship and for other details of his biography. All these combinations lose their basis since the fragment does not belong to Alphanus, and since its date is unkown. The question of the Greek version of the *Viaticus* is thus still at the same point where it was left by M. Steinschneider ("Constantinus Africanus und seine arabischen Quellen," *Archiv für pathologische Anatomie*, XXXVII, 1866, p. 392. NYAM).

[45] R. Creutz, "Der Frühsalernitaner Alfanus und sein bislang unbekannter *Liber de pulsibus*," *Sudhoffs Archiv*, XXIX (1937), 57-83. P. Capparoni, *Il 'Tractatus de pulsibus' di Alfano I Arcivescovo di Salerno*, Rome, 1936 (NYAM). The text had been indicated by E. Wickersheimer ("Note sur les œuvres médicales d'Alphane, archevêque de Salerne," *Atti dell'VIII Congresso Internazionale di storia della Medicina*, Roma, Settembre 1930, Pisa, 1931, 108-11. NYAM).

now no longer extant.[46] This interpretation is supported by a passage in Gilles of Corbeil, who also lists Alphanus among the authors who wrote on pulses.[47]

Even more important for the history of the Salerno school was Constantine the African.[48] Constantine, who was of Arabic descent, came about 1077 to Salerno where he stayed for some time and then went to Montecassino where he translated a large number of medical works from the Arabic and died in 1087. Constantine was in close personal relations with Desiderius, the abbot of Montecassino, and with the archbishop

[46] For other medical texts attributed to Alphanus in medieval manuscripts see Thorndike, *Op. cit.*, I, 753.

[47] Gilles of Corbeil, in his poem *De pulsibus*, asks his Muse to defend him against envious criticism and adds: "Verba Musandino maneant condita sapore / Omnibus aequivoci titulum praetende Salerni / Praesulis Alphani claro signata sigillo" (ll. 254 ff. *Aegidii Corboliensis Carmina Medica*, ed. L. Choulant, Leipzig, 1826, p. 38. NYAM). The editor Choulant correctly explains: "Ut securus sit libellus ab omni iniuria, muniendus est nominibus illustrium doctorum scholae medicae Salernitanae, Musandini scilicet, Salerni et Alphani." Gentile da Foligno (*Egidius de urinis et pulsibus*, Venice, 1514, f. 30 verso. NYAM)) also comments: "Musam suam alloquitur . . . Musandino sapore, idest sapidis et sententiosis auctoritatibus Petri Musandini . . . Presulis, idest archipresulis Salernitani, tantis confisa patronis potes malignis hostibus obviare." Capparoni (pp. 30 f.) and Creutz refer these words to Alphanus' treatise *De pulsibus*. Both of them wrongly refer the participle *signata* to *verba*, whereas it actually belongs to the Muse Clio to whom the whole passage is addressed. De Renzi (*Coll. Sal.*, I, 237) takes these verses as meaning that Gilles had received from Magister Salernus a doctoral diploma sealed with the seal of Archbishop Alphanus. This interpretation is further elaborated by Puccinotti (*Op. cit.*, 256) who derives from this use of the seal of Alphanus another argument for the ecclesiastical origin of the Salerno school.

[48] M. Steinschneider, "Constantinus Africanus und seine arabischen Quellen," *Archiv für pathologische Anatomie*, XXXVII (1866), 351-410 (NYAM). Thorndike, *Op. cit.*, I, 742 ff. R. Creutz, "Der Arzt Constantinus Afrikanus von Montekassino," *Studien und Mitteilungen*, N. F., XVI (1929), 1-44; "Die Ehrenrettung Konstantins von Afrika," *ibid.*, N. F., XVIII (1931), 25-44; "Additamenta zu Konstantinus Africanus und seinen Schülern Johannes und Atto," *ibid.*, L (1932), 420-42. The main sources for Constantine are still his prefaces and the biographies given by Petrus Diaconus. A new source has been made available by Creutz ("Die Ehrenrettung, pp. 40 ff.). It is a passage from an Erfurt manuscript of the thirteenth century, found in a text entitled *Glosula a M. Mathaeo F. super diætas universales Isaaci composita*. The text which certainly comes from Salerno is quite interesting. Yet the report of Constantine is highly anecdotal and should not be utilized without some criticism. Creutz, following Rose, identifies the author with Matthaeus Ferrarius, a supposedly Salernitan writer of the twelfth century. There is a Magister Ferrarius who lived at Salerno in the twelfth century and who is known as the author of extant medical works (Hartmann, 29 f.), but apparently his first name was Johannes. On the other hand, a judge Matthaeus Ferrarius appears in documents of the thirteenth century (Garufi, p. 99. De Renzi, *Storia documentata*, doc. 74, p. LI). In his transcription of the text, Creutz reads: "Johanni congruum duximus dicere," thus crediting the report to Constantine's pupil Johannes. The facsimile shows that the text is *ideo hic*, not *Johanni*.

Alphanus.[49] There can be no doubt that he also taught medicine at Montecassino.[50] But there is no evidence that he taught at Salerno. His most important contributions are his translations of Greek and Arabic medical writings. The fact that he issued some of the translations as his own works has been variously interpreted, but it does not diminish his merit as the first translator and introducer of Arabic science in the Occident.[51] The declamations of Renaissance humanists and of modern nationalists should not blind us against the historical fact that in the eleventh and twelfth centuries Arabic science was definitely superior to occidental science, including early Salernitan medicine, and that the translation of Arabic material meant a definite progress in available knowledge. The same is true for the translations of Greek works from the Arabic, for the simple reason that at that time the Arabs possessed many more works of Greek scientific literature than the Latins, and that in their commentaries and independent works they had made definite contributions to the ancient Greek heritage. The most important of Constantine's versions of Arabic authors are the *Pantegni* of Haly Abbas, the *Viaticus* of Al Dschaafar, and the treatises on diets, on fevers, and on urines, all by Isaac Judaeus.[52] In addition, some of the minor works going under Constantine's name may be based on Arab sources which have been lost or not yet verified.[53] In the case of Greek classical medicine, Constantine's contribution was less revolutionary, since a certain number of authentic and apocryphal

[49] Constantine dedicated the *Pantegni* to Desiderius, and the *De Stomacho* to Alphanus (Creutz, "Der Arzt Constantinus," 16 ff.).

[50] Johannes and Atto, to whom Constantine dedicated several of his translations, were his pupils at Montecassino (Creutz," Additamenta").

[51] Besides the various articles of Creutz, see also Sudhoff, "Konstantin der Afrikaner und die Medizinschule von Salerno," *Sudhoffs Archiv*, XXIII (1930), 293-8. The controversy as to whether Constantine was a plagiarist is as old as the twelfth century. It might be added that Alphanus also failed to indicate that his *Premnon physicon* was a translation from the Greek.

[52] For a list of Constantine's translations from the Arabic see Steinschneider, *Op. cit.* and Creutz ("Der Arzt Constantinus"). Apparently Constantine translated only a part of the *Pantegni*, and the translation was later completed by his pupil Johannes (Creutz, "Der Cassinese Johannes Afflacius Saracenus, ein Arzt aus 'Hochsalerno,'" *Studien und Mitteilungen*, N.F., XVII, 1930, 301-24). A. Castiglioni (*A History of Medicine*, p. 316) lists Isaac Judaeus among the Salerno doctors. Actually he lived in Egypt during the early tenth century.

[53] Herbert Lehmann ("Die Arbeitsweise des Constantinus Africanus und des Johannes Afflacius im Verhältnis zueinander," *Archeion*, XII, 1930, 272-81) makes the gratuitous assumption that Constantine's *De Stomacho* is based on a lost work of Al Dschezzar. R. Creutz and W. Creutz ("Die 'Melancholia' bei Konstantinus Afrikanus und seinen Quellen," *Archiv für Psychiatrie und Nervenkrankheiten*, XCVII, 1932, 244-69. NYAM) derive Constantine's treatise on melancholy from a lost work of Rufus of Ephesus.

writings of Hippocrates, of Galen, and of later Greek physicians had been available in anonymous Latin versions made in the period of transition from late antiquity to the early Middle Ages and continually in use up to the time of Constantine, as the extant manuscripts show. Among them were Galen's letter to Glaucon, one of the major sources of Gariopontus, and Hippocrates' *Aphorisms*, from which Richer had studied medicine at Chartres.[54] Constantine now translated of Hippocrates not only the *Aphorisms*, but also his *Prognostica* and his treatise on acute diseases, all with the commentaries of Galen, as well as several other treatises of Galen, and probably also two Byzantine treatises, one by Theophilus and one by Philaretus.[55] All of these treatises were to form the backbone of medical instruction for a long time, at Salerno as well as elsewhere. The importance of Constantine's translations for the relation of philosophy and medicine ought to be the subject of further investigation. It appears from his own prefaces that he considered medicine as related to philosophy,[56] and it is obvious that his new translations from Galen in particular were of potential philosophical importance, since Galen had absorbed so much of ancient philosophical, and especially of Aristotelian doctrine, which lent itself at any time to further development. Among the Arabic authors translated by Constantine, Isaac Judaeus was not only a medical, but also a philosophical author. On the other hand, it would seem that Constantine was guided in his translations by the interests of practical medicine rather than of philosophical speculation. The two philosophical works of Isaac, *De elementis* and *De definitionibus*, are extant in medieval Latin translations, but these are no longer considered as works of Constantine.[57]

[54] The best survey of these early medical translations is found in Sudhoff, *Geschichte der Medizin*, 167 ff. The manuscripts are listed by H. Diels, *Die Handschriften der antiken Ärzte* (*Abhandlungen der Preussischen Akademie*, 1904 and 1906). See also Loren C. MacKinney, *Early Medieval Medicine*, Baltimore, 1937.

[55] Sudhoff (*Geschichte der Medizin*, 183 f.) attributes the versions of Theophilus and Philaretus to Constantine, since they appear always together with the other translations of Constantine. Steinschneider and Creutz do not mention them in their lists of Constantine's translations.

[56] See his preface to Desiderius in Migne, *Patrologia Latina*, CL, coll. 1563 ff. Petrus Diaconus lists among Constantine's works the *Disputationes Platonis et Hippocratis*, which was probably a translation of Galen's *De placitis Hippocratis et Platonis* (Creutz, "Der Arzt Constantinus," 23 f.). The version is not extant.

[57] The two translations are attributed to Constantine by Steinschneider and Creutz, but merely because they were printed together with Constantine's versions of Isaac's medical works in the sixteenth century. Constantine's authorship is doubted by Jacob Guttmann (*Die philosophischen Lehren des Isaak ben Salomon Israeli, Beiträge zur Geschichte der Philosophie des Mittelalters*, vol. X, no. 4, Münster, 1911, pp. 8 f.) who suggests Gerard of Cremona as translator. The translation of the *De Definitionibus* has been recently

The twelfth century certainly marks the culminating point in the development of the medical school of Salerno. Most of the medical literature connected with Salerno belongs to that century, including the famous Breslau codex. Many of the extant works belong to authors whose name, date, and connection with the Salerno school are definitely established and whose existence is confirmed by contemporary documents or by the testimony of other medical writers. This rich heritage of Salernitan literature includes numerous treatises on general therapy and on more specific topics of practical medicine such as fevers, urines, pulses, and diets, as well as a few tracts on anatomy, the famous surgery of Roger, and the *Antidotarium Nicolai*.[58] The steady progress of medical knowledge as it appears in these writings is based both on direct observation and on the gradual absorption of the material made available by Constantine. For it seems likely that this Constantinian material was not at once fully utilized by the Salernitan doctors, but only after some time.[59] For the transmission of Constantine's translations to Salerno early in the twelfth century an important role seems to belong to Johannes Afflacius who also has been the subject of recent investigation.[60] It is at least very probable that

published by J. T. Muckle as a work of Gerard of Cremona (*Archives d'histoire doctrinale et littéraire du moyen âge*, XI, 1937, 299-340).

[58] For the Breslau Codex see above, note 7. For the anatomical literature of Salerno see: F. Redeker, *Die 'Anatomia magistri Nicolai phisici,'* diss., Borna-Leipzig, 1917 (NYAM). K. H. Benedict, *Die Demonstratio anatomica corporis animalis*, diss., Leipzig, 1920 (NYAM). K. Sudhoff, "Die erste Tieranatomie von Salerno und ein neuer salernitanischer Anatomietext," *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, X (1927), 136-54 (NYAM). Id., "Die vierte Salernitaner Anatomie," *Archiv für Geschichte der Medizin*, XX (1928), 33-50. For the *Antidotarium Nicolai* see F. K. Held, *Nicolaus Salernitanus und Nikolaos Myrepsos*, diss., Borna-Leipzig, 1916 (NYAM). See also Henry E. Sigerist, *Studien und Texte zur frühmittelalterlichen Rezeptliteratur* (*Studien zur Geschichte der Medizin*, XIII), Leipzig, 1923, 187 ff. (NYAM). Sigerist points out that the earlier Salernitan writers who use the *Antidotarium* do not mention its author, and that the commentary on the *Antidotarium* by Platearius does not cover the introduction in which a Nicolaus presents himself as the author (*l. c.*, 188). Yet it should be added that the attribution of the work to Nicolaus is at least as old as the thirteenth century. The commentary on the *Antidotarium* by Joannes de S. Amando does cover the introduction of Nicolaus (*Mesue cum expositione Mondini*, etc., Venice, 1508, f. 313 verso, NYAM), and Jean de St. Amand lived in the latter half of the thirteenth century (E. Wickersheimer, *Dictionnaire biographique des médecins en France au moyen âge*, II, Paris, 1936, 476 ff., NYAM). Also a Paris document of ca. 1270-1274 refers to the *Antidotarium Nicolai* (H. Denifle and E. Chatelain, *Chartularium Universitatis Parisiensis*, I, Paris, 1889, no. 453, p. 517).

[59] An example of the scanty use made of Constantine's versions at Salerno in the early twelfth century is given by Creutz ("Der Magister Copho und seine Stellung in Hochsalerno," *Sudhoffs Archiv*, XXXI, 1938, 51-60).

[60] See the article of Creutz, quoted above, note 52. The chronology given by Creutz is arbitrary on several points.

Johannes, the pupil of Constantine at Montecassino to whom several of Constantine's versions were dedicated, and Johannes Afflacius the author of a few medical treatises and translations which sometimes are attributed to Constantine, are one and the same person, and that this Johannes was at least for some time connected with the medical school of Salerno. In any case, after the middle of the twelfth century the translations of Constantine became the common property of the Salerno school and even the center of its medical teaching.

Medical historians often emphasize the practical rather than speculative character of this Salernitan literature of the twelfth century, and at the same time the role of direct observation and of Graeco-Latin traditions as well as the absence of Arabic influences, of the scholastic method, of philosophy, astrology, and other "superstitions." But what was meant as praise in the light of nineteenth-century medicine would appear to be a criticism in the context of medieval science, in which Arabic influence, scholastic method, philosophy, and astrology were definitely linked with scientific progress, at least for a certain period. The lack of Arabic influence can hardly be maintained for the period after C nstantine with which we are now concerned. There really seems to be less "scholastic" method, less philosophy, astrology, and magic in the Salernitan literature of the early twelfth century than in that of the later twelfth century, or in the medical works of the later Middle Ages in general. But the complete absence of these elements may be doubted even for the early twelfth century.[61]

The extensive medical literature of the twelfth century obviously reflects a corresponding progress in medical teaching at Salerno. Most of the works were written for teaching purposes, and some of them contain definite references to actual teaching which became increasingly broad and methodical. Nicolaus, the author or reviser of the *Antidotarium*, says in his preface that the work was composed at the request of some students of practical medicine.[62] Magister Salernus in the preface to his Compendium addresses his students and claims that he has written his work for their sake.[63] In the *Ars medendi* current under the name of Copho,

[61] A doubt of the supposed absence of magic and superstition at Salerno is expressed by Thorndike, *Op. cit.*, I, 759. Singer ("A Review of the Medical Literature," 116) considers physiological speculation as one of the outstanding characteristics of Salernitan literature.

[62] Ego Nicolaus rogatus a quibusdam in practica medicine studere volentibus ut eos recto ordine modum conficiendi dispensandique docerem . . . (*Mesue cum expositione Mondini*, Venice, 1508, f. 285. Cf. Held, *Op. cit.*, 3).

[63] *Coll. Sal.*, V, 201. See above, note 41. See also the prefaces of the *Tabulae Salerni* (*ibid.*, 233) and of the *Practica Archimatthaei* (*ibid.*, 350).

the author states that he has based his work on the oral teaching of Copho and on the writings of Copho and his pupils.[64] The various treatises on anatomy clearly indicate the practice of anatomical demonstration in the classroom, based on the dissection of animal bodies,[65] and the author of one of the treatises mentions the anatomical demonstrations of his master Matthaeus Platearius.[66] Matthaeus Platearius, who is a tangible historical person of the early twelfth century, may thus have been the first who practised the dissection of animals in the classroom at Salerno. His teaching must have been important in another respect also, because he appears as the author of a commentary on the *Antidotarium Nicolai* which is not only the earliest commentary on that work, but also the earliest extant example of a Salernitan commentary.[67] The appearance of the form of the commentary marks the definite transition from practical to theoretical instruction at Salerno. The form of the commentary originated in classical antiquity, as is well known; it was cultivated during the early Middle Ages in the fields of grammar, rhetoric, and theology, and it assumed increased importance in all fields of learning from the twelfth century. Wherever commentaries appear they reflect a method of teaching based on the reading and explanation of authoritative texts. A thorough study of the history of the literature of commentaries would be a highly desirable and instructive task which would throw new light on the history of education as well as on a vast amount of scientific literature of all periods which has been rather neglected. In any case, the fact that the school of Salerno began early in the twelfth century to shift from the compend and the collection of recipes and prescriptions to the form of the

[64] Ego namque secundum hoc opus de modo medendi a Cofonis ore suisque et sociorum scriptis compendiose collegi (*Coll. Sal.*, IV, 416).

[65] "Quos vobis videntibus ita separavi manifeste . . . ," says one of the authors, who also refers to his demonstration held "anno praeterito. . . . De quibus coram vobis unum incidi et sperma inventum ostendi" (Sudhoff, "Die vierte Salernitaner Anatomie," 36 f.).

[66] Matthaeum siquidem Platearium lucernam et decorem theoricae practicaeque Salernitanorum phisicorum gemmam praeceptorem in hoc sequens qui et in anathomiae lectione evidenter sub sociorum oculis monstravit nil inferens ficticii nisi quae oculis propriis ipse vidi et quae probabilibus rationibus et auctoritate sunt munita veterum (Sudhoff, *ibid.*, 40 f.).

[67] For the commentary of Matthaeus Platearius on the *Antidotarium* see Hartmann, 26 ff. It is printed in *Mesue cum expositione Mondini*, Venice, 1508, f. 285 ff. It begins: "Liber iste quem in presentiarum legendum suscepimus ex multis antidotis est compillatus" (*sic*). These words are in themselves sufficient to prove that the commentary is the result of class lectures. This commentary was the source of Gilles of Corbeil's poem *De laudibus et virtutibus compositorum medicaminum* (substramentum et materiam nostrae expositionis sumentes Glossas super Antidotarium a magistro Mathaeo Plateario editas constituentes, ed. Choulant, p. 48).

commentary, that is, from practical to theoretical instruction, is the first sign that the school was affected by, or contributed to, the rise of "scholasticism." It is also significant that this earliest Salernitan commentary was based on a text which was itself a product of Salernitan teaching and literature. There were more such commentaries on Salernitan works of the twelfth century, which prove that they were used as textbooks both at Salerno and elsewhere.[68]

The next step, which can be traced to the second half of the twelfth century, was to base theoretical instruction in medicine not on the earlier products of Salernitan literature, but on the "classical" works of Greek and Arabic medicine which had been translated by Constantine the African. A commentary on Hippocrates' *Aphorisms* by a Bartholomaeus which is apparently quoted by Magister Cardinalis might have been the earliest example, but it is uncertain whether this Bartholomaeus is identical with the early Salernitan of that name, and his commentary is not extant anyway.[69] The commentary on Isaac's work on diets by a Magister Matthaeus F. who is believed to be Matthaeus Ferrarius of Salerno, has also been assigned to the twelfth century, but would seem to belong to the thirteenth.[70] Magister Urso's *Aphorisms* with his own commentary, of which we shall have to speak again, is an original work by Urso, but in its form it obviously imitates the *Aphorisms* of Hippocrates, and the addition of a commentary to Urso's *Aphorisms* apparently presupposes the existence of similar commentaries on Hippocrates' *Aphorisms*. But the first known example of a Salernitan commentary on a classical medical text was Maurus' commentary on Hippocrates' *Aphorisms*, which may very well belong to the second half of the twelfth century.[71] Maurus is certainly one of the most important medical writers of Salerno, well known not only through several medical treatises current under his name,

[68] Examples are the *Commentarium Magistri Bernardi Provincialis super Tabulas Salerni* (*Coll. Sal.*, V, 269-328), and the *Glosulae quatuor magistrorum super Chirurgiam Rogerii et Rolandi* (*ibid.*, II, 497-724). On the gradual development of the glosses on Roger's surgery see Sudhoff, *Geschichte der Medizin*, 196 f., and Id., *Beiträge zur Geschichte der Chirurgie im Mittelalter*, pt. II, Leipzig, 1918.

[69] The *Glossule afforismorum secundum magistrum Cardinalem* in a Basel manuscript quote a Bartholomaeus about the division of Hippocrates' *Aphorisms* (*Egidii Corboliensis Viaticus*, ed. V. Rose, Leipzig, 1907, 108-10). This magister Cardinalis appears as professor at Montpellier in a document of 1240 (*Cartulaire de l'Université de Montpellier*, I, Montpellier, 1890, doc. 5, pp. 186-90). Sudhoff (*Geschichte der Medizin*, 186) says that the Salernitan Bartholomaeus wrote *Introductiones et experimenta in practicam Hippocratis, Galieni, Constantini*. According to Hartmann (18 ff.), this work is identical with the extant *Practica Bartholomaei* (*Coll. Sal.*, IV, 321-408).

[70] For this commentary see above note 48.

[71] *Coll. Sal.*, IV, 513-57.

but also through contemporary documents, and through the testimony of Gilles of Corbeil.[72] His position has been further clarified by an important discovery of Sudhoff. A Paris ms. of the thirteenth century contains of Maurus not only his commentary on the *Aphorisms*, which had been known before, but also one one Johannitius' *Isagoge*, on Hippocrates' *Prognostica*, on Theophilus' treatise on urines, on Philaretus' treatise on pulses, and on Galen's *Tegni*. Sudhoff has further pointed out that one of the twelfth century Salernitan tracts on anatomy quotes commentaries of the anonymous author on the *Aphorisms*, on Johannitius, and on Philaretus, and hence attributes that treatise with good reasons to Maurus.[73] The discovery of these commentaries is important because they are the first extant of the kind, and they are based on the same group of Greek and Arabic medical texts which had been translated by Constantine, which appears around 1270 as the center of the medical curriculum at Paris, Naples, and Salerno, and which was printed as a unit under the title of *Articella* as late as the fifteenth and sixteenth centuries. Thus the kind of medical curriculum which had been known for the second half of the thirteenth century can now be dated back by almost a hundred years.[74] Moreover, it would seem to follow that this curriculum was first established at Salerno, and from there transferred to Paris, rather than conversely, and this would correspond to what we know otherwise about the relations between Salerno and Paris.[75] Finally we may very well credit Magister Maurus himself with having established this curriculum. Whether this important change in the method of instruction was accompanied by a similar change in theories and ideas, could be established only through a closer examination of his published and unpublished works.

[72] Maurus died in 1214 (Garufi, p. 85). On his medical works see Hartmann, p. 30. R. Buerschaper, *Ein bisher unbekannter Aderlasstraktat des Salernitaner Arztes Maurus*, diss., Borna-Leipzig, 1919 (NYAM). W. L. H. Ploss, *Anatomia Mauri*, diss., Leipzig, 1921 (NYAM).

[73] Sudhoff, "Die vierte Salernitaner Anatomie," 38 f. The manuscript (Paris. lat. 1849) is briefly described by Delisle (*Bibliothèque de l'École des Chartes*, XXXI, 1870, p. 559).

[74] Sudhoff, "Salerno, Montpellier und Paris um 1200," *Archiv für Geschichte der Medizin*, XX (1928), 51-62. Id., "Medizinischer Unterricht und seine Lehrbehelfe im frühen Mittelalter," *Sudhoffs Archiv*, XXI (1929), 28-37.

[75] Sudhoff," Salerno, Montpellier und Paris." The influence of Salerno on Paris is best exemplified in the person of Gilles of Corbeil who studied at Salerno and became the first teacher of medicine at Paris toward the end of the twelfth century. On him see C. Vieillard, *L'Urologie et les médecins urologues dans la médecine ancienne*, Paris, 1903 (NYAM). Id., *Essai sur la société médicale et religieuse au XII^e siècle, Gilles de Corbeil*, Paris, 1909 (NYAM). S. D'Irsay, "The Life and Works of Gilles de Corbeil," *Annals of Medical History*, VII (1925), 362-78 (NYAM).

His commentary on the *Aphorisms* certainly shows a logical training and an interest in distinctions which seems lacking in earlier Salernitan literature and would confirm the impression of an increasing trend towards the "scholastic" method.[76]

The increasingly theoretical character of Salernitan teaching and writing has its correlate in a significant change of terminology which took place about the same time. In classical Latin, the doctor is regularly called *medicus*, whereas the Greek term *physicus* is reserved to the student of natural science or natural philosophy. The same is true of the corresponding terms such as *medicina*, *physica*, and the like. This usage remained unchanged throughout the early Middle Ages. It was not until the early twelfth century that the term *physicus* began to be used for the medical doctor, and it became gradually more frequent and remained in use up to the end of the Middle Ages. It still survives in the English term *physician*. This change of terminology has been made the subject of special studies for France, and the results thus obtained have been confirmed for Salerno, where also the term *physicus* for doctor occurs in the documents from the early twelfth century on and becomes more frequent thereafter.[77] Changes of this kind are not likely to be incidental, and hence we may well ask for its historical reasons, a question which so far

[76] Compare the judgment of Puccinotti, *Op. cit.*, p. 378.

[77] The material from French sources has been collected by L. Dubreuil-Chambardel (*Les médecins dans l'Ouest de la France aux XI^e et XII^e siècles*, Paris, 1914, 221 ff. NYAM). See also A. Chr. Thorn, *Les désignations françaises du médecin et de ses concurrents*, Jena-Leipzig, 1932 (NYAM). The article *physicus* in Du Cange also gives many examples for the use of *physicus* as physician. None of them is earlier than the twelfth century, except the canon 48 of the third Council of Tours (813 A. D.) where the term *physici* may be understood in the classical sense, that is, as natural philosophers (Mansi, *Concilia*, XIV, coll. 96 f.). A similar development at Salerno has been observed by Capparoni (*Magistri*, p. 28). The earliest example seems to be the entry: *Depositio Amati phisici*, which has been assigned to the year 1118 (Garufi, p. 34). The second and more certain example is the death of *Matheus de Paolo doctor in phisica* in 1142 (*Ibid.*, p. 162). Loren C. MacKinney (*Early Medieval Medicine*, Baltimore, 1937, p. 131. New York Public Library) asserts that the use of *physicus* as physician can be traced back to Carolingian times (I am indebted to Miss Genevieve Miller for having called my attention to this work). Professor MacKinney cites a number of passages in Rabanus Maurus, Richer, and other early writers where the terms *physicus* or *physica* clearly refer to physicians and medicine (see also his article, "Tenth-Century Medicine as seen in the Historia of Richer of Rheims," *Bulletin of the Institute of the History of Medicine*, II, 1934, 347-75. NYAM). However, it should be remembered that Carolingian writers traditionally considered medicine as a subdivision of *phisica* (MacKinney, *Early Medieval Medicine*, p. 131). Thus it was possible for Rabanus and Richer to cite medical writers as *phisici*. This is not yet equivalent to the later habit of using the terms *physicus* and *medicus* as synonymous for all practical purposes, although it certainly goes a long way to explain how this later usage could develop.

has been neither posed nor answered, as far as I am aware. The use of *physicus* for *medicus* is not of Arabic origin,[78] and it is definitely prior to the translations of Aristotle's *Physics* and of his other "physical" writings. I am hence inclined to believe that the new use of *physicus* had a programmatic significance and reflected a change in the very conception of medicine. It emphasizes the need for the medical doctor to have a thorough training in natural philosophy and science, and distinguishes him from the mere medical practitioner who lacks such theoretical training. The term thus forecasts, if it does not directly express, that close alliance between philosophy and medicine so characteristic of later medieval and Renaissance science. The term *physica* also shares the development of *physicus* and often came to mean medicine, especially theoretical medicine, but at the same time it preserved its earlier significance and continued to mean natural philosophy and science. The change of terminology was hence an innovation of the twelfth century, but the underlying idea of this change had its antecedents. Galen as well as many of the Arabic physicians were at the same time philosophers, and their medical writings are full of philosophical concepts. Alfanus and Constantine do not use the term *physicus* in the new sense, as far as I know, but they are clearly aware of the close connection between medicine and natural philosophy that was to find its expression in that term.

Whether the new terminology originated at Salerno or in France we cannot well decide on the basis of available evidence. Yet we do know that the idea inherent in that terminology had an effective influence on the trend of the Salerno school during the twelfth century. That is, Salerno made its contributions to science and philosophy, not only to medicine in the narrower sense. We have seen that there are earlier traces of philosophical interest in the works of Alfanus and Constantine and in the theory of the four humors derived from Galen. In the twelfth century this interest in subjects not strictly medical becomes more apparent. The earliest Latin version of Ptolemy's *Almagest* is due to a Salerno student.[79] We have mentioned the logical elements contained in the commentaries of Maurus. If we may trust the colophon of a Munich manuscript, a Salerno student of surgery was also a teacher of logic as early as 1170.[79a] Yet the most important contribution of twelfth century

[78] I am indebted for this information to Professor G. Levi della Vida.

[79] C. H. Haskins, *Studies in the History of Medieval Science*, Cambridge, Mass., 1924, 159 and 191.

[79a] Cod. Lat. Monac. 376, written before 1200, contains the *Cirurgia magistri Rogerii Fugardi a magistro Guidone suo discipulo persecuta et ab eius doctore laudata*. The colo-

Salerno, and perhaps of the Salerno school in general, to philosophical literature is found in the works of another great master, Urso of Calabria, whose importance has been recognized only recently. Urso is a tangible historical person who is mentioned in contemporary documents and in the works of Gilles of Corbeil.[80] His works, most of which have now been published, deal in part with the customary subjects of practical medicine.[81] However, his treatises *De effectibus qualitatum* and *De effectibus medicinarum*, and above all his *Aphorisms*, which are accompanied by a vast commentary composed by himself, bear testimony to his profound philosophical interest and knowledge.[82] It has been pointed out that the *De effectibus qualitatum* shows Urso's acquaintance with the fourth book of the *Meteorology* and with the fourth book of *De coelo*, both of which had then been recently translated under the name of Aristotle.[83] The commentary on his *Aphorisms* contains the first explicit quotation of Aristotle in Salernitan literature, and the abundant use of Aristotelian terms and conceptions in this work would seem to indicate a thorough knowledge at least of the *De coelo* and of the Physics.[84] Urso, and with him the Salerno

phon reads: "Hoc opus in lucem et ordinem redactum fuit ab Aretino Guidone logice professionis ministro rogatu clarissimorum sociorum et egregii doctoris concessu et desiderio anno . . ." 1170, under King William (K. Sudhoff, *Beiträge zur Geschichte der Chirurgie im Mittelalter*, pt. II, Leipzig, 1918, p. 153. NYAM).

[80] Urso died in 1225 (Garufi, p. 183).

[81] Hartmann, 31 f.

[82] G. v. Jagow, *Die naturphilosophischen, ausführlich kommentierten Aphorismen des Magister Urso von Calabrien*, diss., Leipzig, 1924 (NYAM). C. Matthaes, *Der Salernitaner Arzt Urso aus der 2. Hälfte des 12. Jahrhunderts und seine beiden Schriften 'De effectibus qualitatum' und 'De effectibus medicinarum,'* diss., Borna-Leipzig, 1918 (NYAM). R. Creutz, *Urso, der Letzte des Hochsalerno* (*Abhandlungen zur Geschichte der Medizin und der Naturwissenschaften*, no. 5), Berlin, 1934 (NYAM). *Die medizinisch-naturphilosophischen Aphorismen und Kommentare des Magister Urso Salernitanus*, ed. R. Creutz (*Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin*, vol. V, no. 1), Berlin, 1936, 1-192 (NYAM), K. Sudhoff," Constantin, der erste Vermittler muslimischer Wissenschaft ins Abendland und die beiden Salernitaner Frühscholastiker Maurus und Urso als Exponenten dieser Vermittlung," *Archeion*, XIV (1932), 359-69.

[83] Matthaes, *Op. cit.*, 61 and 67 f. For an author of the twelfth century, the book *De mundo* was Aristotelian, not Stoic. The doctrine of the fifth essence is Aristotelian anyway.

[84] *Unde Aristoteles: ex uno pugillo aquae fiunt novem aeris* (ed. Creutz, p. 30 f.) seems to be a somewhat free quotation of *Physics* II, 6, 33 a 22. Aside from most of the basic terms of Aristotle, there occur references to the six kinds of motion (pp. 23 ff.), to the difference between natural and violent action (p. 11), etc. The author once reveals his own name (pp. 62 f.) and repeatedly quotes his other works. Creutz, in his introduction, fails to mention this strong Aristotelian element and emphasizes only the theological passages which he chooses to call Augustinian.

school, thus play an important part in the reception of the works of Aristotle, a process which had such profound effect upon the further development of medieval science and philosophy. Urso is not only among the earliest authors who quote and use the writings of Aristotle on natural philosophy, but he is himself quoted by Radulphus de Longo Campo in his commentary on Alanus de Insulis' *Anticlaudianus*, which shows that the Salerno school at that time had some influence on philosophical developments in France.[85] Urso's works, and especially his large commentary, not only transmit and quote Aristotelian doctrines, but they contain a well developed system of natural philosophy intended to serve as a firm foundation for medical theory and practice. He establishes definite rules about substance, action, motion, and quality, discusses the effects of the four basic qualities, and attempts to derive from them the various diseases as well as their respective therapy. Of particular interest are also some passages dealing with theological questions, with a rational theory of incantations and other extraordinary phenomena, with astrology, and with the relation between various languages of which the author must have had at least some elementary knowledge.[86] The works of Urso certainly would deserve a more extensive analysis as to their philosophical content and sources, and he certainly should find a place in the histories of philosophy.

The twelfth century thus marks for the school of Salerno not only the full development of medical knowledge and literature, but also the gradual emergence of a regular curriculum based on anatomical demonstration and on the study of a group of standard text books, as appears in the commentaries of Maurus, and also an expanding interest in natural science and philosophy, as appears in the works of Urso. On the other hand, we know practically nothing of the organization and institutional development of the school during that important period of its history. The confident assertions made by many scholars about a legally recognized

[85] Sudhoff, "Constantin, der erste Vermittler." The role played by Urso and by Maurus in the reception of Aristotle is emphasized by A. Birkenmajer ("Le rôle joué par les médecins et les naturalistes dans la réception d'Aristotle au XII[e] et XIII[e] siècles," *La Pologne au VI[e] Congrès International des Sciences Historiques*, Varsovie, 1930, 1-15. University of Illinois Library). Unfortunately, the important article contains no references. The commentary of Radulphus on Alanus apparently was not written at Paris, as Birkenmajer and Sudhoff seem to believe, but about 1216 at Montpellier (Manitius, *Geschichte der lateinischen Literatur des Mittelalters*, III, Munich, 1931, p. 800).

[86] On theology, see Urso (ed. Creutz), p 19 and 76 ff. The latter passage speaks of the ascent of the mind towards God. On the theory of incantations, see *ibid.*, pp. 49 ff. and 69 ff. On astrology, see pp. 63 ff. On p. 128, Urso refers to Hebrew, Greek, German, and Arabic words.

public university and an organized guild or *collegium* of physicians that conferred degrees and issued diplomas do not stand the scrutiny of historical criticism. Let us examine the supposed evidence on which such assertions are based.

The most important document which would seem to throw some light on the organization of the Salerno school in the twelfth century is a contract between the city of Salerno and the Norman Count, the later King Roger II. This contract was found by De Renzi after he had published the first edition of his history, and the find was the cause for one of the major changes he made in the second edition. Later historians have either ignored this document, or accepted it without any question.[87] Therefore, it seems necessary to discuss its authenticity in some detail. The document presents itself as a contract between the city of Salerno and Count Roger, concluded at the time when he took possession of the city after the death of Duke William (1127). Most of the articles deal with legal and fiscal privileges granted to the city. Article nine stipulates that the public schools of literature should not be transferred from Salerno, and that their teachers should be approved by the city and its officials.[88] Article ten establishes that the *Collegium* of physicians founded by the Roman emperors and recognized in the whole world shall continue to confer medical degrees after previous examination, and that the persons who have thus obtained their degree shall be allowed to practice medicine without any interference on the part of the *Curia* or officials of the prince.[89] The eleventh article states that in all the territory of the principality of Salerno or in those which may be annexed in the future there should be founded no other medical *Collegium* with the right to confer such de-

[87] The document is printed in *Coll. Sal.*, II, 787 ff. and De Renzi, *Storia documentata*, doc. 177, pp. LXXII ff. It has been discussed as authentic by De Renzi, *Storia documentata* (p. 300; 372 f.; 376 ff.), and more recently accepted as such by Carucci (p. 13 and 475) and by P. Piccinini (*Medicina storica e medicina sociale*, Milan, 1920, p. 99. Army Medical Library). The document has been ignored by Sudhoff, Denifle, Rashdall, and F. Chalandon (*Histoire de la domination Normande en Italie*, Paris, 1907).

[88] Scholae litterariae et publica loca discentium artes et scientias non transeant vel transferantur a civitate praedicta, ubi doceant idonei magistri ab universitate approbati et ipsius universitatis administratoribus juxta consuetudinem (*Coll. Sal.*, II, 788).

[89] Collegium seu publicus conventus magistrorum medicinae et doctorum phisicalium institutum a gloriosissimis et magnificentissimis Romanis Imperatoribus permissumque et confirmatum per totum orbem terrarum ex vetustis notissimisque privilegiis . . . perpetuetur in suo usu et recepto stilo approbandi scholares et doctorandi praevio scilicet examine . . . nec ita doctorati impediantur pro exercitio medicinali ullo modo per principalem Curiam ejusque officiales et ministros cujuslibet dignitatis vel suprema auctoritate fungentes, nec imo deinceps per legem novam perque novum statutum consuetudo ut supra doctorandi moderetur, reformetur vel mutetur . . . (*Ibid.*, 788 f.).

grees.[90] If this document were authentic it would be of far-reaching importance indeed for the history of the Salerno school. As a matter of fact, it is nothing but a forgery of the fifteenth century. The document appears only as an insert in a privilege granted by Alfonso I in 1442. There is no trace of this supposed Norman document before 1442. Neither the original nor any earlier confirmation of it can be shown to have existed. The text of the insert lacks all external criteria of authenticity, such as date and witnesses, which indeed were difficult to invent after such a long time.[91] Moreover, the content of the document is no less suspicious. Not to speak of its style and its historical notions, the document would indicate in the year 1127 not only a *Collegium* of physicians of imperial foundation with a right to confer degrees, but also public schools maintained by the city. None of these facts can be confirmed from any other source for that early period.[92] It is even highly doubtful that the medical school or *collegium* at that time could be made the subject of a contract between the prince and the city. The promise contained in article eight, that Salerno shall remain the capital of all Calabria and Apulia,[93] as well as the promise of article eleven that there shall be no other medical *collegium* in the principality or in the provinces that might be annexed to it in the future, has a meaning only after Naples had become the capital of the kingdom in the thirteenth century, and after there had been founded a *collegium* of physicians at Naples in the fifteenth century. The claim in article ten that the graduates of Salerno should be allowed to practice without interference from the government is in direct contradiction to an authentic decree of the same Roger II, which has been incorporated in the legislation of Frederick II. This decree states simply that whoever wants to practice medicine, should present himself to the royal officials and judges and undergo their examination.[94] Hence the right to grant medical licenses is reserved to the king and his officials, and there is even no mention of the school of Salerno or its supposed

[90] Per totum Principatum annexasque et annectendas provincias sive adquirendas novum non erigatur Collegium pro doctoratu et magisterio praedicto omnesque subditi doctorentur vel approbentur in Salernitano Collegio (*Ibid.*, 789).

[91] In the introduction it is said that Roger took an oath before the archbishop Romuald.

[92] The very conception of the doctoral degree as it is here presupposed did not develop before the thirteenth century.

[93] Quod idem Comes et successores praedicti conservent civitatem in caput totius Principatus nec non totius Apuliae et Calabriae . . . (*Ibid.*, 788).

[94] Quisquis amodo mederi voluerit, officialibus nostris et judicibus se presentet eorum discutiendus judicio . . . (J. L. A. Huillard-Bréholles, *Historia diplomatica Friderici Secundi*, vol. IV, pt. 1, Paris, 1854, p. 149, title 44).

rights. We shall see how this right to confer medical licenses gradually passed from the king to the *collegium* of Salerno, a process which found its conclusion only in the fifteenth century. The spurious Roger document will thus help us to understand the aspirations and conditions of Salerno in the fifteenth century, but it cannot prove anything whatever for the twelfth century. The actual historical facts which gave occasion to the later forgery can be gathered from other sources. There were negotiations between Roger and the city of Salerno in 1127, as the early chronists report, but the privileges granted by the count were of a merely legal and fiscal character. There is no mention of the medical school or *collegium* or of any other school, and it even remains uncertain whether these concessions were made in the form of a written document. The points mentioned by the chronists have been cleverly incorporated in the forged privilege of which we are talking.[95] A few years later, in 1137, Roger again granted privileges to the city of Salerno on account of its loyalty at the time of the war against the emperor Lothar. This document which has been preserved again concerns merely legal and fiscal matters. There is no reference to the medical school, and no mention of any earlier privilege.[96]

Another document has been published more recently by Sudhoff. In a Pommersfelden manuscript of the early fourteenth century, Sudhoff found an anonymous commentary on Gilles of Corbeil's *De urinis* which occurs also in other manuscripts but which here contains a final passage lacking in the other manuscripts. This passage tells of a certain Bartholomaeus who studied at Salerno at the time of Maurus and Urso and finally presented himself for the medical examination. He was examined, according to the custom, on the basis of the *Ars*, *Viaticus*, and *Dietae universales*. The man did not pass the examination, but was advised to continue his

[95] The chronist Romuald reports merely that the Count Roger "a Salernitanis civibus receptus est honorifice quibus tenimenta et possessiones et antiquas consuetudines confirmavit et eos in suo recepit dominio. Turrim tamen majorem in eorum potestate reliquit." The chronist Falco Beneventanus reports the same event as follows: "Juravit statim comes ille Rogerius quod sine judicio et sine culpa eos non capiat neque capi permittat neque extra dies duos in expeditione illos perducat et castellum Turris majoris de illorum potestate non auferat et si quis abstulerit eius auxilio sub eorum potestate restituat . . ." (*Romualdi Salernitani Chronicon*, ed. C. A. Garufi, *Rer. Ital. Script.* VII, pt. 1, p. 214. Chalandon, *Op. cit.*, I, 385 ff.). In the forged document, the right of the citizens to occupy the main tower, is mentioned in article one; their privilege of not being imprisoned without trial and of not being forced into any military expedition beyond two days, is found in article seven.

[96] The document of 1137 is printed in Ughelli, *Italia Sacra* (2nd ed., VII, Venice, 1721, col. 399. New York Public Library).

studies, whereupon he left Salerno and went to Montpellier where he began to attack the doctrine of the Salernitan masters. Gilles of Corbeil, the commentator concludes, took the opposite attitude and adhered to the Salerno school against that of Montpellier.[97] Sudhoff believes this passage was written in the thirteenth century and hence gives us an accurate description of the procedure by which medical degrees were granted at Salerno in the twelfth century. Again I do not see how anything can be inferred as to the twelfth century from this document. The passage is of unknown origin, and Sudhoff himself thinks the anonymous author to be French rather than Italian. It is found in a manuscript of the fourteenth century, and there is no proof that it was written before that time.[98] The content of the story is entirely anecdotal and would seem to have been invented to explain the rivalry between Salerno and Montpellier as it appears in the verses of Gilles. As long as the Bartholomaeus of the story cannot be shown to be a historical person, it is much safer to assume that the details of the graduation as told in the story reflect the customs of the time and country in which the unknown author wrote, rather than those of twelfth century Salerno.

Of no greater value are the other sources sometimes quoted for the organization of Salerno in the twelfth century. De Renzi is not only convinced of the existence of the *Collegium Doctorum* in that period, but he even gives the names of four of its presidents in the twelfth century. One of them is Nicolaus, the author of the *Antidotarium*. The fact that in some of the old editions of the work he is called Praepositus seemed reason enough to claim for him that distinguished position. In the meantime, it has been shown by Wickersheimer that the author of the *Antidotarium* came to be called Praepositus only in the sixteenth century because he was mixed up with Nicolaus Praepositi (Nicolas *Prévost*), a French physician who lived in the fifteenth century. In the older editions and in all manuscripts the author of the *Antidotarium* is called merely Nicolaus Salernitanus.[99] No better is the claim of the other three college

[97] Sudhoff, "Salerno, Montpellier und Paris um 1200."

[98] The works of Gilles were the subject of numerous commentaries up to the fifteenth century; see Sudhoff, "Commentatoren der Harnverse des Gilles de Corbeil," *Archeion*, XI (1929), 129-35.

[99] De Renzi *Coll. Sal.*, I, 217 and 412. Puccinotti (p. 373) understands *Praepositus* as the supervisor of the pharmacists; according to him, it cannot mean the head of the medical school, since that position was reserved to the archbishop. The correct information is given by E. Wickersheimer ("Nicolaus Prepositi, Médecin tourangeau de la fin du XV^e^ siècle," *Bulletin de la Société française d'histoire de la médecine*, X, 1911, 388-97. *NYAM*. Id., "Nicolaus Prepositi, ein französischer Arzt ums Jahr 1500," *Archiv für Geschichte der Medizin*, V, 1912, 302-10).

presidents of the twelfth century. It is based merely on a few verses of Gilles of Corbeil, which do not at all call for such an interpretation. If Petrus Musandinus in a poem full of metaphors is called the peak and sun of Salerno, this does not indicate that he was the head of a medical *collegium*. If the poet addresses his Muse asking her to defend him against his critics with the authority of his Salernitan masters, the *titulus* of Magister Salernus is his authority, and not his supposed title as head of the *Collegium*. And when Romualdus Guarna is praised for his threefold distinction as a physician, as a jurist, and as an archbishop, and is then called *physicae antistes*, this merely indicates that he was a distinguished physician, but does not prove that he was ever anything like the head of a medical *collegium* in Salerno.[100] Equally fantastic are other inferences drawn from the verses of Gilles. When the poet addresses his Muse asking her to defend him with the seal of Alfanus, this refers simply to the medical treatise on the same subject attributed to that author as we have seen above, but does not prove that the seal of the archbishop Alfanus was attached to doctoral diplomas of the Salerno school in the times of Gilles, as De Renzi thinks.[101] Finally when the poet tells of Johannes Castalius that he had seen him in his early years as modest myrtle under his teacher Musandinus, and that he now learns that Johannes has become equal to the highest laurels and cedars, this merely indicates that Johannes has grown in medical knowledge and perhaps in dignity, but not that Gilles was present when John in his early youth obtained the doctoral degree under the presidency of Musandinus.[102] I

[100] On Musandinus see De Renzi, *Coll. Sal.*, I, 236 f. and 412. The main argument for the claim that Musandinus was the head of the school is another verse of Gilles in which the poet tells that he has seen *Johannes Castalius Musandino sub praeside* (ed. Choulant, p. 52, cf. *Coll. Sal.*, I, 245). Yet in a poem of the twelfth century *praeses* does not necessarily mean what *Preside* means in modern Italy. In our passage, *praeses* may be understood as master or teacher. On the *titulus* of Salernus, see above note 47. On Romualdus Guarna see *Coll. Sal.*, I, 239 and 412. *Physicae antistes* means literally the bishop of medicine and plays with the fact that he was bishop and physician at the same time.

[101] On the seal of Alphanus see above note 47.

[102] These are the verses of Gilles (ed. Choulant, p. 52): Mente bona mea Castalius decreta Johannes/ Suscipiat quem dum pueriles volveret annos/ Myrtum humilem Musandino sub praeside vidi/ Audio nunc ipsum summis contendere lauris/ Et sua nobilibus aequasse cacumina cedris." On these verses De Renzi (*Coll. Sal.*, I, 245) comments as follows: Egidio di Corbeil fu suo compagno di studio (i. e., of Johannes Castalius), ed assistè alla solennità nella quale sotto la presidenza di Musandino Giovanni nella sua età giovanile ottenne la laurea." The text does not say this at all. Gilles does not say that Johannes took a degree (and in medieval Latin this degree would not be called a *laurea* anyway as it is in modern Italian), but he compares Johannes in his youth to a myrtle, and now in his present state to a laurel or cedar, that is, to a big tree. The latter com-

should not even have mentioned these ridiculous interpretations if they had not been advanced and endorsed by serious scholars.

Thus it follows that there is no contemporary document from which we can learn anything about the organization of the Salerno school in the twelfth century. There is no evidence of the existence of a *Collegium* of physicians, or of a head of such a *Collegium*, or even of a head of the medical school. There are no privileges or statutes going back to that period, and the belated development of corporative associations in the Norman and Neapolitan kingdom even excludes the existence of such a *Collegium* for that early period.[103] There is no evidence for any academic degrees in medicine formally granted at Salerno in the twelfth century. No diplomas have been preserved.[104] The procedure followed in granting licenses to practise medicine since the time of Roger and long thereafter even excludes the existence of such licensing diplomas issued at Salerno. There is no evidence that the Salerno school in that period was recognized as a legal body by the city, by the king, or by the ecclesiastical authorities. We know more about the development of medical teaching at Salerno, as we have seen above. We know also that the individual teachers gave class instruction to groups of students, but it is likely that this was arranged in each case on a private and temporary basis. We gain the impression that there was some kind of cooperation between the various masters, but this does not prove any regular organization as a guild. We learn from a passage in Gilles of Corbeil what we would easily presume anyway, that the students at a certain stage of their career began to become teachers themselves,[105] but whether there were any examinations, written diplomas, or ceremonies we do not know. As much as we may regret this lack of information about the most important period of the Salerno school, we had better admit our ignorance instead of advancing gratuitous hypotheses. On the other hand, the lack of institutional organization at Salerno in the twelfth century corresponds to what we know

parison acquires a particular significance if we take *Castalius* as a poetical surname, and identify Johannes with Johannes de S. Paulo who later became a cardinal (*Egidii Corboliensis Viaticus*, ed. Rose, p. IV).

[103] G. M. Monti, *Nuovi Studi angioini* (Trani, 1937), p. 472. For the use of the term *socii* see above notes 41, 64, and 66. Many more examples could be easily added.

[104] It is hence wrong to assert that the Salerno school first introduced the custom of conferring academic degrees, as does E. Coppi (*Le Università italiane nel medio evo*, 3rd ed., Florence, 1886, p. 32).

[105] Gilles complains in one passage that Salerno now allows immature young men to teach and practice medicine who would themselves need further instruction and should "pendere magis vetuli doctoris ab ore/ Quam sibi non dignas cathedrae praesumere laudes" (ed. Choulant, p. 123).

of developments at other places. The twelfth century also witnessed the development of jurisprudence at Bologna, of theology at Paris, and of medicine at Montpellier, but it was only in the early thirteenth century that those universities attained a more formal and permanent organization. The definite rules for conferring degrees were established at Paris and Bologna only around 1220. No wonder that such rules do not appear at Salerno some time before that date, especially if we consider that a school of medicine was less directly interested in institutional formalities than a school of law. The simple fact is that the school of Salerno reached the peak of its scientific activity some time before academic institutions had attained, either at Salerno or anywhere else, their definite pattern. Once this fact has been recognized, it is no longer necessary to recur to supposedly lost documents in order to maintain assertions for which no other evidence can be brought forth.[106]

With the works of Maurus and Urso we have already passed into the early thirteenth century. The thirteenth century is generally considered a period of decline for the Salerno school. As a matter of fact, the medical literature of Salerno which has come down to us from that period does not compare in size or importance with that of the twelfth century, although this impression may be modified by further investigations. To thirteenth-century Salerno seem to belong the famous eye treatise of Benvenuto Grafeo, and the gloss on Roger's surgery by Johannes Jamatus.[107] The famous poem called *Regimen Sanitatis* or *Schola Salernitana* had long been considered the chief literary document of early Salernitan medicine. However, more recently this poem has become a kind of Homeric question,[108] and as a result of Sudhoff's extensive studies it would seem certain that there is no definite trace of the poem before the middle of the thirteenth century, that it had no definite form from the beginning, but is based on a floating mass of memorial verses composed at various places through several centuries, verses that were gradually brought together in a comprehensive poem which in its most extensive form is merely the work of the collector De Renzi. There is, however, a nucleus of verses on which Arnald of Villanova early in the

[106] Capparoni (*Magistri*, pp. 20 f.) speaks of a medical corporation founded in Salerno in the twelfth century, and then proceeds to say that this corporation must certainly have had its statutes, that it is certain that the ancient statutes of the School must have got lost in the fifteenth century, and that the extant statutes of the late fifteenth century must have been derived from the original regulations.

[107] Hartmann, pp. 36 f.

[108] The analogy to the Homeric question was first suggested by Daremberg (*L'École de Salerne*, tr. Ch. M. Saint-Marc, Paris, 1880, pp. 39 ff. NYAM).

fourteenth century wrote a commentary, attributing them to the school of Salerno.[109] Sudhoff is inclined to think that Arnald himself is responsible for this collection and attribution, but it would seem at least equally possible that the nucleus of verses commented upon by Arnald was actually composed at Salerno during the latter half of the thirteenth century, whereas the other verses added to it from the time of Arnald down to De Renzi may have no connection with the Salerno school. The *Tabulae Magistri Petri Maranchi* published by De Renzi probably belong to Petrus Marancius, who is known to have taught at Salerno in the second half of the thirteenth century.[110] I am also inclined to place in this period the commentary of Magister Matthaeus F. on Isaac's treatise on Diets, which is found in an Erfurt manuscript.[111]

There is even less known about philosophical literature from thirteenth-century Salerno. Puccinotti attributes to Salerno a commentary on Aristotle's *De generatione animalium* written down by Gentile da Cingoli from the lectures of a Johannes Vatherius whom he identifies with Walther Aquilo.[112] However, this identification is wrong, and the connection of Walther Aquilo with Salerno is doubtful, whereas we know definitely that Gentile da Cingoli was connected with Bologna and probably studied at Paris.[113]

Another large work of philosophical interest, the *Placita philosophorum moralium antiquorum*, has been published by De Renzi, supposedly as a translation from the Greek made by John of Procida.[114] John of Procida was not only a famous politician who played a leading part in the events leading to, and resulting from, the Sicilian Vespers, but he also was a renowned physician. Since he was from Salerno, he probably had his training there, but there is no evidence that he ever taught at Salerno.

[109] K. Sudhoff, "Zum Regimen Sanitatis Salernitanum," *Archiv für Geschichte der Medizin*, VII (1914), 360-2; VIII (1915), 292-3; 352-73; IX (1916), 221-49; X (1917), 91-101; XII (1920), 149-80. Singer, "The School of Salerno," *History*, N. S. X (1925-6), 245 f.

[110] The *Tabulae* are published in *Coll. Sal.*, IV, 558-65. On the author see Capparoni (*Magistri*, 45 f.).

[111] See above, note 48.

[112] Puccinotti, p. cxxx.

[113] On Walter Agilon see Hartmann, pp. 37 f. On Gentile da Cingoli see M. Grabmann, *Mittelalterliches Geistesleben*, II (Munich, 1936), p. 265 and 270. Grabmann has since published another article on Gentile da Cingoli of which I have seen only a review by J. Müller (*Divus Thomas*, XIX, no. 4, Dec. 1941, pp. 454 f. I am indebted for this reference to Lt. Comdr. George B. Fowler). Grabmann identifies Gentile's teacher with Johannes Vate who taught at the faculty of arts in Paris around 1290. The tradition that Thomas Aquinas taught theology at Salerno is entirely unfounded.

[114] *Coll. Sal.*, III, 69-150.

Moreover, his connection with the so-called *Placita* is quite uncertain. The work in question has been shown to be a translation not of a Greek but of an Arabic original, composed by Mubashshir in the eleventh century, and translated into Spanish under the title *Bocados de Oro*. It was quite popular in the later Middle Ages and was translated also into French and English. The Latin version is apparently based on the Spanish version, not directly on the Arabic original. The recent editor Franceschini is still inclined to consider John of Procida as the author of the Latin translation, but the arguments he sets forth in support of this opinion are rather weak. Additional reasons given from internal evidence by Sabbadini are stronger, but not decisive. The connection of the work with John of Procida remains dubious, and there is no connection with the Salerno school in any case.[115]

Whereas we know little about the scientific activities of the Salerno school in the thirteenth century, the sources for its organization and institutional development in that period are the more abundant and interesting. Indeed the school assumed a legal status only at that time. The first official regulations concerning the school of Salerno are contained among the constitutions of the emperor Frederick II, published at Melfi in 1231.[116] Article 45 of book III describes the procedure for the granting of a medical license as follows: the candidate has to pass a public examina-

[115] "Il 'Liber philosophorum moralium antiquorum,'" ed. E. Franceschini, *Atti del Reale Istituto Veneto*, XCI (1931-2), pt. 2, 393-597. E. Franceschini, "Il 'Liber philosophorum moralium antiquorum,'" *Memorie della R. Accademia Nazionale dei Lincei, Classe di Sciense Morali*, Ser. VI, vol. III, fasc. 5, 1930, 355-99. R. Sabbadini, "Il traduttore latino del 'Liber Philosophorum,'" *Atti del Reale Istituto Veneto*, XCII (1932-3), pt. 2, 537-40. I am indebted for these and other references to Dr. Franz Rosenthal. Franceschini (*Memorie*, pp. 373 ff.) tends to maintain the attribution of the Latin version to John of Procida. Yet this attribution rests only upon the testimony of one Paris manuscript which is dated 1410 and offers a bad text. From the fact that this manuscript contains the entry *Opera Petrarchae*, Franceschini concludes that the copy is based on a manuscript owned by Petrarch and hence tries to trace the attribution to John of Procida back to Petrarch. Actually the entry merely indicates that some ignorant owner of the manuscript took the *Placita* for a work of Petrarch. The other manuscripts are all of the fourteenth or fifteenth century, and none of them gives a translator's name, except a Venice manuscript of the fourteenth century which has a good text and attributes the version to King Robert of Naples. Robert's authorship has been rightly rejected by Franceschini and Sabbadini. Yet we know that Robert, following the example of his predecessors, quite regularly had his salaried translators, especially from the Arabic and Greek. Hence it would seem quite possible that the version of the *Placita* is due to one of those translators and could thus be attributed to Robert himself.

[116] Huillard-Bréholles, *Op. cit.*, IV, pt. 1, pp. 150 f. Alfred Baeumer, *Die Ärztegesetzgebung Kaiser Friedrichs II und ihre geschichtlichen Grundlagen*, diss., Borna-Leipzig, 1911 (Army Medical Library).

tion before the masters at Salerno, and then, with a certificate of his loyalty and knowledge signed by the masters and the royal representatives, he has to present himself to the king or his representative in order to obtain the license.[117] If we compare this decree, not with the forged Roger privilege for Salerno, but with the authentic decree of Roger about medical licenses incorporated in the same collection of Frederick as article 44, it is obvious that Frederick increased, rather than diminished, the privileges of the Salerno school.[118] For whereas Roger had reserved the right to grant licenses to the king alone without any further qualification, Frederick makes the examination at Salerno a prerequisite for the license. This change corresponds to the developments which a few years before had taken place at Paris and Bologna, where around 1220 the granting of degrees in law and theology was reserved to the chancelor or archdeacon, respectively, but made dependent upon a previous examination before the masters of each faculty. On the other hand, it is equally wrong to assume that Frederick II's decree gave the Salerno school the right to grant medical licenses and to issue licensing diplomas. The Salerno masters merely examine the candidate, apparently in the presence of a royal representative, and sign together with that representative a testimonial letter addressed to the king and confirming the loyalty and scientific adequacy of the candidate. The right to grant the license and to issue the licensing diploma remains with the king, and it is hence no wonder that no such diplomas issued by the Salerno school itself have been preserved. On the other hand, samples of licenses granted by the king are extant and confirm the above interpretation. They have the form of a letter addressed by the king to his officials in a certain city or province, and state that the physician has presented himself before the royal *Curia*, has been examined as to his loyalty and medical knowledge and receives herewith the permit to practise medicine. Usually this permit is limited to the city or region of the officials to whom the letter is addressed. The previous examination at Salerno is not mentioned explicitly.[119] Two more

[117] Jubemus in posterum nullum medici titulum pretendentem audere practicare aliter vel mederi nisi Salerni primitus in conventu publico magistrorum judicio comprobatus cum testimonialibus literis de fide et sufficienti scientia tam magistrorum quam ordinatorum nostrorum ad presentiam nostram vel nobis a regno absentibus ad illius presentiam qui vice nostra in regno remanserit (ordinatus accedat) et a nobis vel ab eo medendi licentiam consequatur (Huillard-Bréholles, p. 150).

[118] For the authentic decree of Roger, see above, note 94.

[119] For examples of such royal licenses see Huillard-Bréholles, p. 150. Carucci, doc. 184, p. 328. G. Del Giudice, *Codice diplomatico del regno di Carlo I e II d'Angiò*, I (Naples, 1863), pp. 234 f.

points are worth noticing in Frederick's decree. The Salerno masters have to sign a certificate not only as to the medical knowledge of the candidate, but also as to his political loyalty to the king. In this as well as in the fact that a royal official countersigned the certificate and probably was present at the examination appears clearly a political interference of the state in the activity of the school, and if it were an exaggeration to say that Salerno thus became a State University, it seems at least obvious that the school was subjected to a kind of state supervision in exchange for its legal recognition. Moreover, the expression *in conventu publico magistrorum* merely means that the masters who at the time were teaching medicine at Salerno were supposed to be present at the examination and to form, so to speak, an examining commission. Obviously the *collegium doctorum* as a permanent institution did not yet exist, and the custom of forming an examining commission from the doctors present at the time was merely the starting-point for a development which eventually resulted in the establishment of the *Collegium*.[120]

Of no less interest is article 47. The decree requires that in each town of the kingdom the fabrication of drugs should be handled by two pharmacists, but that at Salerno it should be supervised by the masters in medicine. The decree further prescribes that no one is allowed to teach medicine or surgery except at Salerno, or to assume the title of master unless examined before the royal officials and the masters in his subject.[121] Salerno is thus recognized as the only medical school of the kingdom, a place which it had to share later with Naples. The assumption of the master's title is obviously equivalent with the right to teach medicine or surgery at Salerno, but different from the license to practice medicine at other places, with which the previous article was dealing. The procedure accordingly is different in that the medical license was granted by the king, whereas the master's title is apparently granted by the Salerno

[120] That *conventus* means the meeting of the Salerno masters is confirmed by the official Greek version of the decree, which has *οἱ μὴ πρότερον δοκιμασθῆ ἐν τῷ φανερῷ συνεδρίῳ τῶν μαϊστόρων* (Sudhoff, "Der griechische Text der Medizinalverordnungen Kaiser Friedrichs II," *Mitteilungen zur Geschichte der Medizin und der Naturwissenschaften*, XIII, 1914, 180-2. NYAM). The term *conventus* later came to mean academic degree, and this development was possible since the degree was granted by the *conventus* (meeting or commission) of masters. Puccinotti (p. 256 and 258) takes *conventus* as monastery and hence derives one of his specious arguments for the monastic origin of the Salerno school.

[121] Ut nullus in medicina vel chirurgia nisi apud Salernum legat nec magistri nomen assumat nisi diligenter examinatus in presentia nostrorum officialium et magistrorum artis ejusdem (Huillard-Bréholles, p. 151). Later the words *vel Neapolim* were added after *Salernum*.

school itself. However, the interest of the state is again maintained, since the examination is to be held in the presence of royal officials. This decree concerns more directly the organization of the school itself. As we have seen above, it seems to follow from the verses of Gilles of Corbeil that there was some custom in the twelfth century according to which the Salerno students at some stage of their career began to teach and thus became masters. Gilles even complains of the abuse that some began to teach and to practice who were much too young and had better continue their studies. He does not refer to any formal procedure connected with that change of status.[122] It is hence very likely that Frederick II for the first time set down fixed regulations for the conferring of degrees at Salerno and thus tried to eliminate the abuses indicated by Gilles. The assumption of the master's degree now becomes an official act, presupposing an examination and serving itself as the prerequisite for teaching. There is no trace of diplomas as yet, but there may have been a notarial act after the examination.

These decrees were supplemented a few years later by another law of Frederick II, dated around 1241 and included as article 46 in the same collection.[123] The Salerno school is not mentioned by name, but since the decree is dealing with medical training, it is understood to refer to Salerno. The emperor first prescribes three years of study in logic as a prerequisite to medical study proper, which is to last five years and to include surgery. In order to obtain a medical license, the candidate is required to undergo an examination *iuxta curie formam* and to present a certificate from his masters as to the duration of his studies. After a few other prescriptions dealing with the professional duties of the physicians, the decree requires one year of practical training under an experienced physician, in addition to the five years of medical study. The medical professors (*magistri*) must lecture within those five years on the standard textbooks of Hippocrates and Galen, both on theoretical and on practical medicine. A surgeon who wishes to be admitted to practice must present a certificate from his medical professors to the effect that he has studied at least for one year that part of medicine which deals with surgery, and in particular that he has learned at school the anatomy of human bodies.

In this important decree three points deserve special attention. First we notice that the study of logic is made a prerequisite to the study of medicine. Since this point is accompanied with a general argument [124] it would

[122] See above, note 105. [123] Huillard-Bréholles, pp. 235 ff.

[124] Quia nunquam sciri potest scientia medicine nisi de logica aliquid presciatur,

seem to be an innovation, although it obviously had its precedents in the method of such masters as Maurus or Urso. In any case, this is the first evidence that any subject other than medicine was taught at Salerno, and also the earliest example for the link between logic and medicine as parts of the same curriculum and of the same career, a fact which later became increasingly important both at Salerno and at the other Italian universities.[124a] The second point concerns the textbooks prescribed for the teaching of medicine. The emperor does not prescribe the authentic works of Hippocrates and Galen to the exclusion of the apocryphal works attributed to those authors, as the passage has sometimes been understood, but he prescribes their authoritative works, that is, those which had been used before in the teaching of medicine.[125] If we remember that the works of Hippocrates and Galen constitute an important part in the group of medical texts translated by Constantine, and that Maurus had already used these texts in the classroom as his extant commentaries show, we shall readily believe that this somewhat vague prescription of Frederick was not an innovation, but rather the formal confirmation of a previously-established custom. Finally, the requirement that the surgeon should have studied the anatomy of human bodies has often been taken to mean that Frederick prescribed the dissection of human bodies, which would have been the first example of the kind in the Middle Ages. However, Sudhoff has rightly pointed out that there is no trace of human dissections at Salerno in that time, whereas the dissection of animals, especially of pigs, had been an established custom at Salerno since the early twelfth century. The passage of Frederick's decree requires only that the student should learn the anatomy of human bodies in class, but he could do so very well, according to the opinion and customs of the time, through the study of texts and tables and through the dissection of animals.[126]

King Conrad, Frederick's successor, tried in 1252 to transfer to Salerno the university of Naples, founded by Frederick in 1224, and thus to estab-

statuimus quod nullus studeat in medicinali scientia nisi prius studeat ad minus triennio in scientia logicali; post triennium si voluerit ad studium medicine procedat in qua per quinquennium studeat.

[124a] If we accept the date 1170 in the colophon quoted above, note 79a, the teaching of logic at Salerno would go back to the twelfth century, and Frederick's decree would merely confirm a previous situation.

[125] Magistri vero infra istud quinquennium libros authenticos tam Hippocratis quam Galeni in scholis doceant, tam in theorica quam in practica medicine. In the same sense we find the expression *librum autenticum in medicina* in a Montpellier document of 1240 (Cartulaire, doc. 5, pp. 186-90).

[126] Presertim anatomiam humanorum corporum in scholis didicerit. Cf. Sudhoff, *Geschichte der Medizin*, 193.

lish at Salerno a university of a more complete and modern type which was to combine the privileges and the teaching subjects both of the medical school of Salerno and of the university of Naples. If the attempt materialized at all, it was certainly of an ephemeral character.[127] Yet the qualification of the Salerno school as a *Studium* may go back to this episode, as well as the persistent later attempts to obtain for Salerno a recognized advanced instruction in subjects other than medicine. King Manfred restored the university of Naples in 1258 and prohibited all other universities in the kingdom, but he explicitly made an exception for the medical school of Salerno, thus reducing it to the status it had held under Frederick II.[128]

A considerable number of documents concerning the school of Salerno has been preserved from the time of Charles I of Anjou. The king issued not only many medical licenses by royal authority, but he also insisted that no one should be allowed to practice unless provided with such a royal license. This procedure was also applied to physicians from Salerno, and the text of the licenses does not indicate whether they were granted upon previous examination at Salerno as required by Frederick II.[129] Charles went even farther and interfered with the right of the Salerno school to grant the master's degree independently, although in the presence of a royal official, a right which had been recognized by Frederick II. In a letter of 1277, addressed to his governor, the king complains that to the great harm of his royal honor and of the fame of Salerno alike, ill-qualified students have been receiving a medical degree at Salerno. The king hence orders that henceforth no one is to receive a degree in arts or medicine at Salerno without a special royal permit. The governor should announce this decree to all students and professors, and watch over its execution.[130] We learn from this document that there were professors not only of medicine but also of the arts at Salerno, and that degrees were likewise granted in medicine and in arts.[131] Moreover, the letter states for the first time that the decree should be published in a meeting of all students (*Universitate scolarium congregata*), a belated and modest trace of the

[127] De Renzi, *Coll. Sal.*, I, 318. Denifle, 236 f.

[128] De Renzi, *Coll. Sal.*, I, 318 f. A similar exception was made in the decrees of Robert (1309) and of Joan I (1365), see De Renzi, *Coll. Sal.*, I, 366.

[129] See above note 119. See also Carucci, doc. 282, p. 426.

[130] Carucci, doc. 341, pp. 475 f.

[131] Ut nullus de cetero in artibus et specialiter in scientia medicine conventum in Salerno presumat recipere absque speciali nostri culminis licentia et mandato. The term *conventus* here stands clearly for the academic degree. That the decree was executed appears from two documents of 1280 (Carucci, p. 521, and doc. 371, pp. 520 f.).

corporation of students as it is so well known from Bologna and other Italian universities.

On the other hand, Charles granted considerable new privileges to the school of Salerno. In 1269 he grants tax exemption to all students staying at Salerno, and it is in this connection that Salerno appears for the first time, except for the brief episode under Conrad, as a regular university (*studium*).[182] Two documents of 1272, one signed by the prince regent Charles (II), the other by the king himself, insist strongly on the observation of this privilege which had been disregarded by the city, and we learn on this occasion that the privilege had been obtained for the students through the intervention of Petrus Marronus, a professor of medicine, and that it applied especially to students of medicine.[183] In another document of the same year the king asks to apply the same privilege to a Bartholomaeus Suraca if he can prove with a certificate of his professor that he is studying at Salerno.[184] In 1276 a similar tax exemption is granted as a special favor to Petrus Caputscrofa, a medical professor.[185] The same privilege is extended in 1280 to all Salerno professors of medicine.[186] In a letter of 1277, the king informs the physician Matthaeus Scillatus that he has charged master Musa of Palermo with the translation of some Arabic books, and asks Scillatus to help Musa in his work to which he will attend in Salerno.[187]

Of even greater importance are two documents of the year 1280. The first is a letter of the king to Jacobus Nicamus, professor of medicine at

[182] De Renzi, Coll. Sal., I, 365: Scolares in Salernitano Studio commorantes.

[183] Carucci, doc. 270, pp. 411 f., and doc. 272, pp. 413 f. It appears from a comparison of these two documents that the title *Salernitanus doctor in fisica*, which also occurs in many other documents of the time, is equivalent with *medicinalis scientie professor*. The degree acquired at Salerno entitles and even obliges the candidate to teach there, whereas the license to practice medicine is something different.

[184] Si vobis constiterit Bartholomeum Surracam de Salerno per licteras doctoris ejus in dicto Salernitano Studio morari atque studere (Carucci, doc. 278, p. 418).

[185] Carucci, doc. 326, p. 462.

[186] De Renzi, *Coll. Sal.*, I, 365. Carucci, doc. 381, p. 530. The text makes it quite clear that it is a newly granted privilege, and not the confirmation of an old one as De Renzi thinks.

[187] Carucci, doc. 345, p. 481. There are many known cases of translators of Arabic and Greek texts in the service of the Anjou kings who thus continued the traditions of the Norman and Swabian sovereigns. Yet this is the only case where a connection between these translators and the Salerno school becomes apparent. There is no such evidence for the more famous translators such as Ferraguth and Niccolò da Reggio. Musa translated Pseudo-Hippocrates, *De curationibus equorum*, see M. Steinschneider, "Die europaeischen Übersetzungen aus dem Arabischen," *Sitzungsberichte der kais. Akademie der Wissenschaften in Wien, Philos.-Hist. Klasse*, CXLIX, no. 4, 1904, p. 58. Steinschneider identifies Scillatus with Silvaticus.

Salerno, in favor of Magister Petronius Marancius. The latter, who is called a professor of logic and has completed his medical studies, now wants to obtain his degree in medicine. Marancius has presented himself with testimonial letters of his Salerno professors confirming that he has held disputations and given extraordinary lectures, and has then been examined by two physicians at the royal *Curia*. The king, on request of Marancius, now orders Nicamus to confer upon Marancius the medical degree in the presence of the other professors and students and with the customary ceremonies. Marancius has taken the prescribed oath and promised, among other things, to teach and hold disputations at Salerno for sixteen months after his graduation.[188] This document contains many details of major interest. It appears that logic was actually taught at Salerno according to the decree of Frederick II, and also that the professor of logic would at the same time be a student of medicine and eventually, after having completed his studies and taken his degree, become a professor of medicine. This was to become a general rule at most Italian universities. Moreover, the procedure described in the document shows how a medical degree was granted at Salerno as a result of the recent regulation of 1277. The examination at Salerno is followed by an examination at the royal *Curia*, and the conferring of the degree at Salerno is dependent on a royal order. That is, the medical degree which entitles the candidate to teach medicine at Salerno requires now the same conditions that had been required for the medical license ever since Frederick II. Only the solemn ceremony is added in which the candidate receives in public the book and honor of his degree, since the king " does not intend to interfere with the honor of the doctors at the university of Salerno." The ceremony with the book appears for the first time in this document, as far as Salerno is concerned. It is called a previous custom, but we do not know when it was introduced. Petronius Marancius appears later as a city physician at Venice, and we have already mentioned him as the author of a brief medical work.[189]

The other document of 1280 is a statute of Charles I for the school of Salerno, the first regular statute the school ever received, and the first in which it is explicitly recognized as a *Studium generale* in medicine. To obtain the degree of *Baccalarius* in medicine at Salerno the candidate is now required to have studied medicine for forty months if he has previously taken a degree in arts, otherwise he must study for 56 months.

[188] De Renzi, *Storia documentata*, doc. 213, pp. xcviii f. (who gives the date 1276); Carucci, doc. 371, pp. 520 f. (who calls the addressee Jacobus Ricardus).

[189] Capparoni, *Magistri*, pp. 45 f., see above note 110.

He must have held disputations and given two courses. He has to undergo an examination at Salerno before all the professors and then to present himself with their testimonial letter at the royal *Curia* where he will be examined again by the royal physicians. The candidate then has to take an oath and to promise, among other things, to teach at Salerno for sixteen months, and he may also himself select the professor from whom he wants to obtain his degree. The *Baccalarius* must have attended at least one course on Theophilus, Philaretus, and the four treatises of Isaac, and at least two courses on the remaining parts of the *Ars medica*, and on the *Regimenta acutarum*. This statute is almost identical with a similar statute for Naples, published in 1278. The list of texts is apparently taken from a Paris statute issued a few years before. Yet the curriculum now formally established must have been nothing entirely novel for Salerno, since almost the same group of texts had been the subjects of the lectures and commentaries of Maurus long before the decree of 1280.[140]

About the scientific activity of the Salerno school in the fourteenth century very little is known. Whether Guido of Arezzo, who in one manuscript appears as the reviser of the *Glossa Quattuor Magistrorum* on Roger's *Chirurgia*, lived in that period and whether he had anything to do with Salerno, remains uncertain.[141] The famous Arnald of Villanova wrote a commentary on the *Regimen Sanitatis Salernitanum* and thus paid his tribute to the reputation of the Salerno school, but he had hardly any personal connection with that school. Yet Caesarius Coppula, author of a few medical *Consilia*, seems to have taught medicine at Salerno in the early fourteenth century.[142] More famous is Matthaeus Sylvaticus,

[140] The statutes are found in De Renzi (*Coll. Sal.*, I, 361 f., with the date 1276) and Carucci (doc. 370, pp. 515 ff.). For the list of texts see Haskins (*Op. cit.*, 369). Sudhoff, "Medizinischer Unterricht," p. 35. The passage reads: "teneatur baccalarius audivisse bis ordinarie ad minus omnes libros artis medicine exceptis urinis Theophili et libro pulsuum Philareti quos sufficit audivisse semel ordinarie vel cursorie, item regimenta acutarum bis ordinarie, item quattuor libros Ysahac scilicet Viaticum, dietas universales, urinas, librum febrium semel ordinarie ad minus." The *Ars medicine* included, besides Theophilus and Philaretus, a number of short treatises of Hippocrates, Galen, and Johannitius. The *Regimenta acutarum* are of Hippocrates. The *Viaticus* is here wrongly attributed to Isaac, whereas it is actually by Al Dschazzar. Apparently all the works included in this list are translations of Constantine the African. The letter with which Charles I transmitted the statute *universis doctoribus et scolaribus studii Salernitani in medicina* is given by Carucci (doc. 372, p. 521).

[141] De Renzi, *Storia documentata*, 526. Yet see above note 79a.

[142] The *Consilia* are published in *Coll. Sal.*, IV, 566 f. A Caesarius Coppola appears in documents of 1325 and 1328 (De Renzi, *Storia documentata*, 530) and died in 1337 (Capparoni, *Magistri*, 48). There is likewise a Cesarius Coppula in a document of 1270,

author of a work entitled *Pandectae medicinae* which was printed in the fifteenth century. It is not sure whether he belonged to Salerno by birth, but he certainly taught there during the early fourteenth century.[143]

The official documents concerning the development of the school in that period are scanty but important. King Charles II in a letter of 1307 informs his officials in Salerno that he has been paying an annual salary to Johannes de Rogerio, ordinary professor of medicine, and that the payment should be continued for his lifetime even if he should not be able to continue his lectures on account of his advanced age. It does not appear in what year the salary was first assigned to Johannes, but this is the earliest evidence we have for a public salary being paid to a professor at Salerno. The decree was confirmed by King Robert in 1311.[144] This appears to be an individual case, but in 1338 King Robert authorized the city of Salerno, at its own request, to pay an annual salary to two professors of medicine, using for that purpose the income of certain taxes. This was meant as a permanent regulation, since the names of the two professors are not given.[145] Obviously Salerno, the oldest university, maintained longest the old system of salaries paid by the students to their professor on the basis of a private contract, and began only in 1338 to adopt the new system of public salaries, which we find at Vercelli as early as 1228, but at Bologna only toward the end of the thirteenth century. The document of 1338 is also the earliest evidence of the fact that the city of Salerno began to take a direct interest in the medical school. From this moment the university gradually became a city institution, and it was to keep this character up to the end of its existence.

Another important step was taken under queen Joan I in 1359. When the queen renewed the old decree that no one should be allowed to practice medicine without a royal license, Salerno made a petition claiming that the decree interfered with the old customary right of the school to

again a medical doctor (Carucci, doc. 221, pp. 365 f.). Whether these were two persons or one is not clear, and if they were two we can hardly decide which of them was the author of the *Consilia*.

[143] De Renzi, *Coll. Sal.*, I, 341 ff. Capparoni, *Magistri*, 49. The preface of Angelus Cato is reprinted in De Renzi, *Storia documentata*, doc. 255, pp. cvi ff., and in M. Fava and G. Bresciano, *La stampa a Napoli nel XV secolo*, Vol. II, Leipzig, 1912, pp. 71 ff.

[144] De Renzi, *Coll. Sal.*, I, 366 f. There were earlier cases of royal payments made to Salerno doctors, but apparently they were salaries paid for the medical treatment of the king or his family rather than for their teaching at Salerno.

[145] The king assigned to the city a certain sum, "pro earum gagiis duobus doctoribus eiusdem scientie . . . qui in ipsa civitate morantes illius studio inibi studiose presideant et assidue legant scolaribus" (R. Caggese, *Roberto d'Angiò e i suoi tempi*, II, Florence, 1930, p. 408).

confer medical degrees. The queen gave a favorable reply to the appeal and confirmed the custom forever that physicians who had obtained a certificate from the medical professors of Salerno should be allowed to practice medicine in the whole kingdom, without any additional royal license.[146] Of course, the claim had no foundation in any previous document, and the custom either did not exist at all, or had developed quite recently and in direct contrast to all previous laws. But once the queen had recognized the claim, it became henceforth legal, and the Salerno school acquired now the right not only to confer degrees without the restriction imposed by Charles I, but also to grant medical licenses without royal interference, thus overriding the royal rights as established by Roger and Frederick II. Moreover, the Salerno licenses were considered valid for the whole kingdom, whereas the royal licenses usually had been limited to one city or province.

Nothing is known of the scientific activities of the Salerno school in the fifteenth century. The work of Saladino of Ascoli, *Compendium Aromatariorum*, belongs to this period, but the fact that the author was from Southern Italy and made some use of the *Antidotarium* of Nicolaus does not permit the conclusion that he ever taught or even studied at Salerno.[147] There are, however, a few royal documents illustrating the further institutional development of the school. First in order is a privilege granted in 1413 by king Ladislaus on the request of Gulielmus Solimena, professor of medicine and a royal physician and official. Referring to earlier privileges and to an old custom as well, the king grants forever a complete tax exemption to all Salernitan professors and students of medicine and surgery.[148] This is the earliest document in which the term *Collegium* is applied to the Salerno doctors, but it is used in the phrase *Collegium seu Universitas medicorum et chirurgicorum in civitate ipsa*, in a second passage it is said to include the students as well,[149] and in

[146] Approbamus consuetudinem predictam concedentes physicis presentibus et futuris quod medici seu physici ipsi eorundem magistrorum testimonio seu testimonialibus ipsorum literis comprobati in scientia supradicta absque alia lictera regia et reginali possint et valeant practicare libere in dicta scientia medicinali per regnum (De Renzi, *Coll. Sal.*, I, 362 f.). Mazza mentions the same document with the date 1365 (*Op. cit.*, p. 64). De Renzi fails to publish the text of the petition, and hence we have reason to doubt the correctness of his report which speaks repeatedly of a *Collegio Salernitano*. The reply of the queen does not refer to a *Collegium*.

[147] De Renzi (*Coll. Sal.*, I, 386 ff.) has no doubt about Saladino's connection with Salerno, but fails to give any evidence.

[148] De Renzi, *Coll. Sal.*, I, 374 ff., and also, with a better text, *Storia documentata*, doc. 333, pp. cxxvi ff.

[149] Dictum Collegium et Universitas medicorum et chirurgorum ipsorum ac scholarium praedictorum civitatis ejusdem.

both cases it is used as an equivalent of the previously used formula *omnes et singuli physici et chirurgici dictae civitatis Salerni*. An organized *Collegium doctorum* hence has not yet been established at Salerno, but it may be said to be in process of formation, since a privilege is granted to the whole group. However, the group is quite different from the *Collegium doctorum* in its later form, since it includes the students, and since it has not a limited membership, but consists of all medical professors and students staying at Salerno at any given time. From another document of the same time it appears that the city of Salerno appealed to the king against the tax privilege granted to the doctors and students, asserting that the exemption had no foundation in old privileges or customs and should hence be reexamined and possibly canceled. The king hence orders his judge at Salerno to decide the controversy between the city and the physicians. It does not appear from the document what decision was made, but later developments would suggest that it was favorable to the physicians. This second document does not speak of a *Collegium*, but simply refers to *omnes et singuli phisici et chirurgici*.[150]

There are no documents on Salerno for the time of Joan II, but under her reign an important development took place which indirectly concerns also the school of Salerno: the foundation of the medical *Collegium* of Naples. It appears from the documents that this *Collegium* was in existence in 1423 and for some years before that date, although we cannot determine the precise time of its foundation. In any case, this *Collegium* received its final organization and legal status through the statutes issued by Joan II in 1430. As Prior or head of the medical *Collegium* of Naples appears from 1423 on and still in 1430 Salvatore Calenda, a doctor of medicine from Salerno, who had received another office from the queen as early as 1415.[151] Mazza and after him De Renzi and other more recent

[150] De Renzi, *Storia documentata*, doc. 334, pp. cxxvii ff. De Renzi (*Coll. Sal.*, I, 376) considers this document as a final confirmation of the previous one.

[151] For the documents of 1423 and 1430 concerning the *Collegium* of Naples see De Renzi, *Coll. Sal.*, I, 377. For Salvatore Calenda, *ibid.*, 371 f. The history of the medical *Collegium* of Naples has been recently treated by G. M. Monti (*L'Età Angioina*, in *Storia della Università di Napoli*, Naples, 1924, 58 ff.; and *Nuovi Studi Angioini*, Trani, 1937, 470 ff.). Monti found a document of 1321 in which a medical *Collegium* is mentioned (magistris medicinalibus . . . quorum Collegio aggregamus eundem tanquam doctorem eiusdem scientie . . .), but he admits that the expression is not yet used in the later, technical sense. Thus the document of 1423 remains the first evidence of the medical *Collegium* of Naples. The statute of 1430 has: "Collegium artium et medicinæ doctorum quod alias in dicta civitate (Naples) a nostris praedecessoribus illustribus Siciliae Regibus ordinatum viguit reformare creare atque melius ordinare" (*Coll. Sal.*, I, 377). Yet this phrase may have been taken over from the statutes of the *Collegium* of jurists (1428), which actually seems to have existed in the fourteenth century (*Monti, Nuovi Studi Angioini, l. c.*).

scholars assert quite confidently that Salvatore Calenda was the head not only of the *Collegium* of Naples but also of that of Salerno.[152] This statement does not rest on any documentary evidence, but merely on the assumption that the Salerno *Collegium* must have been in existence at that time and that Salvatore Calenda, being from Salerno and appearing as the head of the Naples *Collegium*, must also have been the head of the Salerno *Collegium*. Since we have found no trace of the existence of the Salerno *Collegium* so far, the qualification of Calenda as its head is as gratuitous as that of his supposed predecessors in the twelfth century. Documentary evidence seems to suggest another solution. In the list of the members composing the Naples *Collegium* in 1430 appear, aside from the Prior, Salvatore Calenda, two other physicians from Salerno.[153] Moreover, when the city of Salerno presented its petition and the forged Roger document to king Alfonso in 1442, the king says in his reply to article 11 that the *Collegium* of Naples was founded some years before with the previous consent of the Salerno doctors.[154] It seems very likely that the medical school of Salerno gave its consent to the foundation of the medical *Collegium* of Naples, either in 1430, or some years before that date, and obtained in exchange for this concession the right to be itself represented by several members in the Naples *Collegium*, at a time when a similar institution apparently did not yet exist at Salerno and was not even contemplated.

Under queen Isabel, who governed the kingdom for her absent consort, René of Anjou, the city of Salerno obtained in 1435 a confirmation of all its statutes and privileges.[155] The document does not mention the medical school or the *Collegium Doctorum* and thus gives additional support to our statement that there is no trace of the supposed Roger privilege or of the existence of the *Collegium Doctorum* before 1442.

We can now understand what conclusions we may draw for the development of the Salerno school in the fifteenth century from the forged Roger privilege and from the reply made by King Alfonso in 1442 to the petition of the city of Salerno, based on that forgery. The moment for

[152] Mazza, 65. De Renzi, *Coll. Sal.*, I, 377 and 412. They are followed by Monti and Sinno.

[153] Luigi Trentacapilli and Paolino Caposcrofa are the names of the two other Salernitan members of the medical *Collegium* of Naples in 1430 (De Renzi, *Coll. Sal.*, I, 373).

[154] Neque officere Collegio Neapolitano quod nonnullis abhinc annis coactum et erectum fuit praecedente consensu illorum de Collegio Salernitano (*Coll. Sal.*, II, 790). The use of the expression *Collegium Salernitanum* in this document of 1442 does not prove its existence in 1423 or 1430, see below.

[155] De Renzi, *Storia documentata* (doc. 341, pp. cxxx f.) who gives the wrong date 1405.

presenting unwarranted claims was particularly favorable when the kingdom had just been conquered by a new ruler who belonged to a foreign dynasty and hence was supposedly unfamiliar with the laws and customs of the country. The forged document is nothing but a number of claims and does not prove anything about the actual conditions at the time of the petition, but whatever part of the claim was recognized by the king thus became the legal foundation for successive developments. For our purpose only articles 9-11 are of interest. Article nine claims public instruction in the arts and sciences, with teachers approved by the city and its officials.[156] Actually the city had been in control of the university since the fourteenth century, and it had paid salaries to professors of medicine. We know that logic also had been taught at Salerno, and we may presume that natural philosophy had been added before that period, but we do not know whether the city had paid any salaries to the teachers of these subjects. The city may also have maintained secondary schools with instruction in grammar, rhetoric, and mathematics, but it does not appear whether and since what time that was the case. On the other hand, the teaching of law had always been since 1224 an exclusive privilege of the university of Naples. The prohibition against the teaching of law in any other city of the kingdom was repeated more than once, and it was enforced several times against the attempts of various towns to organize advanced teaching of law.[157] Apparently there were a few isolated cases of professors of law at Salerno from the thirteenth century on,[158] but this was never officially recognized by the king as was the teaching of medicine. Accordingly, Alfonso in his reply to the vague claim of article nine, reserves the rights of the university of Naples, adding that the city of Naples, at the time of Count Roger did not yet belong to the principality of Salerno (the king hence does not recognize the spurious character of the Roger privilege), and adds that the masters of civil and canon law at Salerno should not hold public lectures nor confer degrees without royal permit.[159] Since this permit might be obtained in individual cases, this is

[156] See above, note 88.

[157] For the suppression of law teaching outside Naples see Caggese, II, 406.

[158] The death of a *Thomas Scillatus iuris civilis professor* is recorded in 1304 (Garufi, p. 43). Even in 1254 Innocent IV addressed a letter *magistro Jacobo Vulturo iuris civilis professori viro salernitano*, who then was first judge of Salerno and its principality (Carucci, doc. 152, pp. 275 f.).

[159] Magistros vero iuris civilis et canonici non ausuros publicas scholas habere nec scholares approbare ad doctoratum nisi nostra licentia impetrata, idemque capitulum non officere Civitati Neapolis quae tempore pacti initi non erat sub ditione dicti Comitis Rogerii neque pertinebat ad Principatum Salernitanum (*Coll. Sal.*, II, 790).

not an entirely negative decision and marks at least the first step toward a recognized teaching of law at Salerno. Article ten speaks of the *Collegium seu publicus conventus magistrorum medicinae et doctorum phisicalium*, established by the Roman emperors and confirmed all over the world by old and well known privileges, which has had the customary right to confer degrees in arts and medicine after previous examination and whose graduates are entitled to practice medicine without interference from the *Curia* and its officials.[160] This is the first mention of a *Collegium Doctorum* at Salerno to be found in any document. From this passage it cannot be inferred that the *Collegium* was in existence in 1442, but only that the city wanted to have such a *Collegium*. This desire shows a new attitude on the part of the city toward the Salerno physicians. As late as 1413 the city had strongly opposed the tax privileges granted to the doctors by the king, whereas the city now endorses the foundation of a corporative organization of the Salerno doctors. The wording is clever, because the *publicus conventus magistrorum medicinae* is taken over from the decree of Frederick II and is used as a synonym for *Collegium doctorum*, whereas in the original decree it did not have that meaning at all, and thus there is given the appearance of an imperial foundation for the newly-planned *Collegium*. The right to confer degrees in medicine and arts had been legally exercised at Salerno since Frederick II, and the right to grant medical licenses valid for the whole kingdom since Joan I, but these rights belonged to the medical professors of Salerno as members of the university, but not as members of a separate professional corporation which did not even exist at that time. Now these rights are to be transferred to the new institution. The reply of Alfonso to this article is affirmative, making only some reservation with regard to the laws of Frederick II.[161] The city thus obtained its purpose, and a legal recognition was thus granted for the establishment of a medical *Collegium* at Salerno, with the right to confer degrees and to issue medical licenses. The same point is reinforced by article eleven. The city claims that there should be no other *Collegium* in the principality of Salerno and all other provinces annexed to it, and that all subjects should get their degrees and approbation from the *Collegium* of Salerno.[162] This was an attempt to eliminate the *Collegium* of Naples and to acquire for the new *Collegium* of Salerno a kind of monopoly for the whole kingdom. The king in his reply

[160] See above, note 89.

[161] Decimum capitulum item placet eidem Regiae Maiestati constitutionibus dicti Friderici Regis pacto et capitulo derogatoriis neque obstantibus.

[162] See above, note 90.

to this article rejects the demand, reserving the right to confer degrees for the *Collegium* of Naples which had been founded with the consent of the Salerno doctors, but at the same time he implicitly recognizes the existence and privileges of the *Collegium* of Salerno.[103] The forgery was hence to some extent successful, and the existence of a medical *Collegium* at Salerno, independent of the one at Naples, was legally recognized.

The remaining documents of the fifteenth century are of small importance. In 1451, Alfonso granted some legal privileges to the city of Salerno, and about the same time he confirmed a tax exemption to the Salerno doctors. In 1462, the city obtained a confirmation of its privileges from King Ferrante. The document which was countersigned by Roberto da Sanseverino, then prince of Salerno, mentions especially the rights possessed by the city under Joan II and under Alfonso.[104]

Whether the *Collegium Doctorum* was actually founded in 1442 or remained on paper for some time we do not know. In any case, it does not make its appearance in the documents until 1473, and it took several more decades until it attained its final status and organization. The document of 1473 is the earliest extant doctoral diploma issued at Salerno. It is signed by *Jacchetta de Granita prior doctorum collegii et studii Salernitani*, and by five other doctors.[105] Here appears for the first time the head of the *Collegium* with the title *Prior*, but the wording of his title does not show whether the *Collegium* has yet become legally and actually separate from the *Studium*. The second extant diploma is of 1494. It is signed by *Paulus de Granita medicine doctor Prior in medicine scientia, Adrianus de Aurofino artium et medicine doctor Prior in philosifhie (sic) scientia*, and by five other *artium et medicine doctores de Collegio Salernitano*.[106] The wording suggests that the *Collegium* has now become a separate unit, but at its head there are now two *Priores*, one for medicine and one for philosophy. From this time on, all extant doctoral diplomas up to 1525 show the names of two *Priores*. A diploma of 1529 is the first signed by a single *Prior in artibus ac medicina*, and from that time on only one *Prior* appears as the head of the *Collegium*.[107]

[103] See above note 154. I think the Alfonso document itself to be authentic, both on account of its precise date and of its partly negative character.

[104] De Renzi, *Storia documentata*, doc. 345-347, pp. cxxxxvi f. Another document of Ferrante which is dated 1477 and again confirms the rights and privileges of the *Studio Salernitano* is given by Settembrini (pp. 947 f.).

[105] Sinno, "Vita scolastica," p. 40. Id., "Cronologia dei Priori," pp. 277 f.

[106] Sinno, "Vita scolastica," 40 f. Id., "Cronologia dei Priori," 281.

[107] Sinno, "Cronologia dei Priori," 279-83. Id., "Diplomi di laurea," 238 ff.

The definite organization of the *Collegium* appears in the *Capitula et Constitutiones Collegii et Studii in artibus et medicina*, which seem to belong to the last few years of the fifteenth century.[168] Article one fixes the number of the *Doctores de Collegio in qualibet facultate* as ten. When one of them dies, the next in rank takes his place. Article two prescribes that the oldest in rank is always to be Prior for life. The statutes then define the requirements for the admission of a candidate to a degree and the procedure for the examination. For the membership in the *Collegium*, twenty years of residence at Salerno are required. Degrees are to be conferred in medicine and in philosophy. After many details concerning examination fees and the like, the last article establishes the examination subjects: Galen's *Tegni* or Avicenna's *Canon*, plus Hippocrates' *Aphorisms* in medicine, Aristotle's *Physics* and *Posterior Analytics* in arts.[169]

The *Collegium* was thus established towards the end of the fifteenth century as an autonomous institute with its own statutes and privileges, including a limited membership for life, and the exclusive right to confer degrees and licenses.[170] The extant documents show that from that time on the *Collegium* enjoyed a continued existence up to 1812 and that its essential characteristics as they appear in the statutes remained unchanged. A good number of extant doctoral diplomas have been preserved and many of them have been published. They begin with the diplomas of 1473 and 1494, of which we have spoken, and they go down in an almost continuous line to 1811. Most frequent among the degrees conferred is that of doctor in philosophy and medicine, or in arts and medicine. Less frequent are the degrees of doctor in medicine only, or in philosophy only. There are also a few degrees in surgery, as well as some licenses in medicine, and later some licenses in pharmacy.[171] Some of the diplomas list

[168] The text of the *Capitula* is given by De Renzi, *Coll. Sal.*, I, 378-81. The signatures attached to the oldest copy of these statutes reflect the membership of the *Collegium* at the time of their composition, and allow the conclusion that this oldest copy was made before 1500, the date of another copy of the same statutes, and after 1494, the date of an extant doctoral diploma (Sinno, "Cronologia dei Priori," 279 f.).

[169] Quod puncta medicinalia dentur in libro tegni vel prima fen primi libri Avicennae in theorica, in practica aliud in lib. Aphoris., in artibus autem unum in libro phisicorum, et aliud in libro posterorum analiticorum (*Coll. Sal.*, I, 381).

[170] In a legal quarrel with the Grand Chancellor of the kingdom during the seventeenth century, the *Collegium* of Salerno admitted that its official registers did not go back beyond 1500 (De Renzi, *Coll. Sal.*, I, 398).

[171] Sinno ("Diplomi di laurea") lists 71 diplomas of which he publishes a few samples. Later he added a few more to this list ("Cronologia dei Priori"). A few other diplomas which are also included in Sinno's list were published by Del Gaizo ("Documenti

the examination subjects which always correspond to the last article of the statutes and remained unchanged until the early nineteenth century: Galen, Avicenna, Hippocrates, and Aristotle's *Physics* and *Posterior Analytics*.[172] Medicine thus appears at Salerno, as elsewhere in Italy, in close alliance with philosophy, and logic as well as natural philosophy, both on the basis of Aristotle, constituted a required part of the medical training. It is hence of special interest to note that Agostino Nifo, the famous philosopher, appears at Salerno as the chief examiner in a doctoral diploma of 1525.[173]

We know from other documents that the candidate was required to present evidence of his completed studies, but that he was not obliged to have studied at Salerno. Apparently it was a common practice for physicians to study at Naples and afterwards, on the basis of testimonial letters of their Naples professors, to take their degree at Salerno. This was the case, for example, with Marco Aurelio Severino, a distinguished physician

inediti"), and by Capparoni ("Diplomi di laurea"). However, Sinno's list includes only the extant doctoral diplomas of the *Collegium* of Salerno. The number of degrees actually conferred at Salerno between 1473 and 1812 was much larger. It results from the registers of the *Collegium*, which have not been published, but which were described and utilized by Settembrini ("Le carte") and Del Gaizo ("Documenti inediti"). These registers begin in 1566. Del Gaizo (p. 194) distinguishes between the degree in medicine and philosophy and the degree in medicine and arts, whereas these are merely different names for the same degree.

[172] A diploma of 1525 lists the following examination subjects: "in primo libro microtenni Galieni; in primo libro aphorismorum; in tertio libro phisicorum; in primo posteriorum analecticorum" (Sinno, "Diplomi di laurea," 231 ff.). A diploma of 1573 gives: "unum ex Arist. lib. p. Ph'orum (i.e. Physicorum); alterum ex Hippocratis lib. p. Aphor.; tertium ex p. art. med.; ultimum in p. Post." (i.e. primo Posteriorum; Capparoni, "Diplomi di laurea"; I follow the text of the facisimile, whereas Capparoni's transcription contains many mistakes). The same four texts are listed in a diploma of 1640 (Capparoni, *l.c.*), and in another of 1564 (Del Gaizo, *l.c.*, p. 220). Three medical examinations in Dec. 1811 were based on two texts only, one of Hippocrates and one of Aristotle. The text of Aristotle was taken twice from the *Physics*, and once from the *De Coelo* (Settembrini, pp. 944 f.). The number of questions hence seems to have been reduced from four to two in the later period, but Aristotle was still among the subjects as late as 1811. Pietro Antonio de Martino in his work *Responsum Trutinae medicae Musitani* (Naples, 1699) asserts that when he took his degree at Salerno he had to swear: "quousque reget os, dum spiritus arctus, semper Peripateticam et Galenicam tutari sententiam" (De Renzi, *Coll. Sal.*, I, 409).

[173] The candidate, Johannes Antonius de Finis de Castro Veteri, took his degree in medicine and arts on Jan. 17, 1525. He was presented to the *Collegium*: "per Nobilem virum Augustinum Niphum de Medicis philosophum Suessanum Comitem Palatinum ac militem, ordinarium et perpetuum nostri Collegii promotorem dignissimum." See the diploma published by Sinno ("Diplomi di laurea," 231 ff.). The position of Nifo on that occasion was exceptional, since the promotor was regularly the oldest member of the *Collegium* after the Prior.

of Naples early in the seventeenth century, who was in correspondence with many leading scientists of his time.[174]

The basic statutes of the *Collegium* were later supplemented by a number of other decrees. Of particular interest among them are those dealing with the organization of teaching. In a decree of 1551, the *Collegium* establishes that only those students who have studied logic and philosophy for three years are to be considered as "students of the *Collegium*" and can enjoy their privileges.[175] Apparently this was intended to limit the number of those students who were to enjoy tax exemptions according to the old privileges. Another decree of 1588 contains further regulations for the curriculum. It establishes that no student is allowed to begin the study of logic unless he has completed the study of grammar. Thereafter, he has to study logic and philosophy for four years before he can be admitted to the degree in philosophy. Only after three additional years of medical studies can he be admitted to the degree in medicine.[176] A decree of 1633 reduced these terms to three and half, and to two and a half years, respectively.[177]

It is quite clear from the text of these decrees that the *Collegium* had some kind of connection with the students and exercised its authority over the organization of teaching at Salerno. However, it is quite wrong to assume, as most scholars dealing with this period of the Salerno school have done, that the *Collegium* as such was a teaching institution and identical with the university.[178] The *Collegium* is the younger and the better organized institution, and from its beginning it had taken over some of the rights of the university. The *Collegium* was also closely connected with the university, since most doctors of the *Collegium* at the same time were professors. Moreover, the *Collegium* had the right to confer degrees in medicine and philosophy. For all these reasons, it is quite understandable how the *Collegium* could exercise a kind of supervision over the study and the students of philosophy and medicine as the above decrees show. On the other hand, it is quite clear from other evi-

[174] Del Gaizo, "Documenti inediti," 201. Severino took his degree in 1606. Another famous graduate of the *Collegium* of Salerno was Nardo Antonio Recco (1564), author of the *Rerum Medicarum Novae Hispaniae Thesaurus* (Del Gaizo, 196 and 220). These examples should be sufficient to qualify Singer's remark that Salerno in its later period became a "place of bogus degrees."

[175] *Coll. Sal.*, I, 389.

[176] *Ibid.*, 391 f.

[177] *Ibid.*, 393 f.

[178] Sinno consistently disregards this distinction, whereas De Renzi quite correctly emphasizes it (*Coll. Sal.*, I, 403).

dence that there was a definite legal difference between the *Collegium* and the *Studium*, that is, the university. During the sixteenth century, not only medicine and philosophy, the subjects represented by the *Collegium*, were taught at Salerno, but also law, and sometimes theology, and there were times in which the teaching of law seems to have been even more important than the teaching of medicine.[179] Moreover, all professors received their salaries from the city, which thus continued the custom established in the fourteenth century, and they were appointed by the city for a limited period, mostly for four years. This procedure applied equally to all teaching subjects, that is, to medicine and philosophy as well as to law.[180] The only published list of professors, which is of 1592, contains three professors of law, two of medicine, two of logic, one of canon law, and one of philosophy.[181] It is obvious that the chairs of medicine, philosophy, and logic were in most cases given to members of the *Collegium*. But as we see from many documents, the doctors of the *Collegium* were professors not on the basis of their membership in the *Collegium*, which was for life, not dependent on the city, and entitled them to examination and other fees, not to a salary; but on the basis of a special contract with the city, with a salary and for a limited period.[182] The

[179] The city budget of 1603 assigns a total of 466 ducati to the *lettori di legge*, and only 263 ducati to the *lettori di medicina et di filosofia* (*Coll. Sal.*, I, 403). Giovan Vincenzo de Roggiero was appointed to teach theology in 1579, after having taught philosophy for several years (Sinno, "Cronologia dei Priori," 285).

[180] There are records of salaries paid by the city for 1483 and for 1603. aside from several individual contracts between the city and the professors (*Coll. Sal.*, I, 402 f.).

[181] De Renzi, *Coll. Sal.*, I, 403. One of the three jurists is called *glosista*, one of the two professors of logic, *lettor della posteriora*, i. e., of the *Analytica Posteriora*. In 1595 all professors of law as well as of medicine and philosophy were confirmed for another four years (Sinno, "Vita scolastica," 54 f.). Another list of chairs for the year 1652 is given by Del Gaizo ("Documenti inediti," 209 f.), but it is not clear whether it refers to Salerno or to Naples. It includes professors of medicine, philosophy, metaphysics, logic (*lettore del libro della posteriore*, and *lettore dell'arte vecchia*), civil law (including one *glossarum interpres*), canon law, grammar, humanities, and one *lettore primario dell'anima* (i. e., of Aristotle's *De anima*).

[182] In 1539, the city abolished two chairs of medicine; one of the professors hit by the decree was Paolo Grisignano, Prior of the *Collegium*, who protested against the decree and obtained a compromise (Sinno, "Vita scolastica," 46). In 1556, two members of the *Collegium* appear as *lettori concorrenti* and were involved in a quarrel; one of them lectured *de differentiis febrium* (*Ibid.*, 52 f.). One of them, Francesco Alfano, was reappointed as occupant of the *lettura pubblica della medicina* in 1578 (Sinno, "Cronologia dei Priori," 286 f.). The other one, Gian Nicola de Roggiero, was reappointed for four years in 1574 and for other six years in 1578 (*Ibid.*, 287 f.). In 1574, Antonello de Roggiero, Prior of the *Collegium*, makes a contract with the city authorities to teach for six years "in almo gimnasio salernitano duas lectiones philosophie arbitrio studentium

chairs of logic and philosophy may often have been given to younger graduates who were not yet members of the *Collegium*,[183] and at least in 1592 the number of chairs in medicine, philosophy, and logic, was smaller than the membership of the *Collegium*. The separate legal existence of the university is expressed in the office of the *Rettore degli Studi* who appears in the documents from 1537 on and was elected by the doctors of the *Collegium*, by the professors of law, and by the officials of the city.[184] This procedure illustrates very well how the *Collegium* had a close connection with the university teaching of philosophy and medicine, and on the other hand, how the university administration was also determined by the city, and by the faculty of law. The distinction between the university and the *Collegium* is thus quite clear, and it is confirmed by what we know about similar developments in other Italian cities.

In its scientific activities, Salerno shows a marked revival during the sixteenth and early seventeenth centuries, which is quite modest if compared with the achievements of the twelfth and thirteenth centuries, but certainly in contrast with the complete decay of the late fourteenth and of the fifteenth centuries. Some of the law professors published treatises in their field, and one of the jurists, Giovanni Angelo Papi, became quite famous and later was called to teach at Avignon and Bologna.[185] Another famous jurist, Angelo Spanocchi of Siena, taught at Salerno from 1570 until 1585 when he was called to Bologna.[185a] In view of the increasing importance of the teaching of law at Salerno it is quite significant that the city in the early seventeenth century made an attempt to obtain a *Collegium* of jurists with the right to confer degrees in law, but the attempt met with no success.[186]

More abundant, however, were the contributions of Salerno to medical literature. A considerable number of Salerno physicians of that period

diebus temporibus et horis solitis" (Sinno, "Vita scolastica," 65). In the same year, Metello Grillo, another member and future Prior of the *Collegium*, assumes a chair of medicine (Sinno, "Cronologia dei Priori," 288).

[183] In 1613, Matteo Forte is admitted as a member of the *Collegium* after having lectured for one year on *lo primo di fisica* (Sinno, "Vita scolastica," 65 f.).

[184] Mazza, 71 f. Sinno, "Vita scolastica," 67 ff.

[185] On Papi see N. Toppi, *Biblioteca Napoletana* (Naples, 1678), p. 126. Toppi lists also the following legal authors who apparently taught at Salerno in the late fifteenth and in the sixteenth century: Niccolò Capograsso, Giovanni Niccolò de Vicariis, Sebastiano Maffa, and Tommaso Simeontio (149; 221; 299; 327).

[185a] E. Costa, "La prima cattedra pomeridiana di diritto civile nello studio bolognese durante il secolo XVI," *Atti e Memorie della R. Deputazione di storia patria per le provincie di Romagna*, Ser. III, vol. XXII (1904), 250 ff.

[186] Mazza, 64.

are said to have written or published treatises on medicine: Boccuccio Grillo, Decio Pennella, Francesco Alfano, Lorenzo Grillo, Camillo Tesauro, Michele Vicinanzo, and Paolo Grisignano.[187] The latter author dedicated one of his works to the Neapolitan philosopher Simone Porzio.[188] In the seventeenth century, Vincenzo Petrone went as a professor of medicine to Pisa. He also published several works, one of which deals with the rivalry between the physicians of Salerno and of Naples.[189]

Giovan Vincenzo de Roggiero, who taught philosophy and theology at Salerno, published a work whose subject is on the borderline between theology and medicine.[190] Giovan Nicola de Roggiero, who published also a few works on medicine, is said to have written several treatises on logic including an exposition of Averroes,[191] and Antonello de Roggiero is also credited with a work *De substantia orbis* which would seem to be a commentary on Averroes' treatise of the same title.[192] Many of these works are the result of lectures given at Salerno. All these facts point to a definite revival of the Salerno school in the sixteenth century, a revival commonly attributed to the active interest of Ferrante Sanseverino, prince of Salerno in the early sixteenth century. Under his influence Agostino Nifo, the philosopher, seems to have taught at Salerno for many years.[193]

[187] See De Renzi, *Coll. Sal.*, I, 404 ff., and *Storia documentata*, pp. 591 ff.

[188] De Renzi, *Storia documentata*, 593 ff.

[189] The work is entitled *Litterarium duellum inter Salernitanos et Neapolitanos medicos.* Another Salernitan doctor, Michele Rocco, then published an *Anticensura in litterarium duellum inter Salernitanos et Neapolitanos medicos* (1650). See De Renzi, *Coll. Sal.*, I, 408.

[190] *Quaesitum quam utillimum an mater ad prolis generationem concurrat active in quo Galeni et Aristotelis* (?) *inter se ample disputant, adhuc positio Scoti et D. Thomae in eo adducitur et impugnatur* . . . (Naples, 1558). De Renzi, *Coll. Sal.*, I, 406. On his teaching see above note 179.

[191] *Coll. Sal.*, I, 406 f.

[192] *Ibid.*, I, 404.

[193] On Sept. 28, 1525, Ferrante Sanseverino granted from the revenues of the city of Salerno a pension for life to Agostino Nifo whom he calls *nostris temporibus alter Aristotiles* (Toppi, p. 383). The same Ferrante granted on Jan. 16, 1525, an ecclesiastical benefice in Salerno to the astrologer Luca Gaurico (*Ibid.*, 384). It is easy to assume that Ferrante thus tried to attract the two famous scholars to Salerno. Apparently he did not succeed with Gaurico who stayed in Venice at the time when he received the benefice, and also during the following years (E. Pèrcopo, "Luca Gaurico ultimo degli astrologi," *Atti della Reale Accademia di Archeologia, Lettere, e Belle Arti*, XVII, Naples, 1896, pt. II, no. 1, pp. 22 f.). Nifo, however, who had taught at Salerno in 1507 (Tiraboschi, *Storia della letteratura italiana*, vol. VII, pt. 1, Naples, 1781, pp. 339 ff.) actually appears in a Salerno document in 1525 (see above note 173) and seems to have stayed in Salerno from 1525 until his death in Jan., 1538 (Tiraboschi, *l. c.*; the date 1537 given by Tiraboschi is based on a letter of Vincenzo Martelli and must be understood according to the Florentine style, in order to make it agree with the date suggested by

The literary activity of the Salerno physicians continued after the middle of the seventeenth century. Several of these works seem to reflect the traditions of the medical school and of the *Collegium* of Salerno, and it is quite characteristic that one of the last medical writers of Salerno, Matteo Polito, published the *Regimen sanitatis Salernitanum* with the commentary of Arnald of Villanova and with a new commentary of his own.[194] The university reform of the eighteenth century affected Salerno to some extent. In 1744 we find there a professor of physics and geometry,[195] and in 1791 there is mention of newly-established chairs of obstetrics and practical surgery.[196] A few years later, in January 1812, the school of Salerno was closed, on the basis of a decree of king Joachim Murat published in December 1811.[197] Its scientific achievements certainly had long remained much below its medieval standard, but even during the last centuries of its existence the school had maintained at least a local importance and reputation.

I hope that as a result of these somewhat painstaking investigations the following conclusions will be accepted with a reasonable degree of certainty: The medical school of Salerno did not originate in the ninth century, let alone in classical antiquity, but towards the end of the tenth century. It did not start as a regular university, but as a private group of medical practitioners whose medical teaching, at first purely practical, became increasingly theoretical after the middle of the eleventh century. The school gradually developed a scientific method and a regular curriculum during the twelfth century, and attained a legal status and royal privileges in the thirteenth. Its scientific decline did not take place in the early thirteenth century, but rather before the middle of the fourteenth; at the same time the school underwent a reorganization as a city university, which led to a modest and rather local revival in the early sixteenth century. The *Collegium Doctorum* as an organized corporation of doctors, with a Prior at its head, a limited membership for life, and the right

other documents). Nifo who was one of the most prolific and influential philosophical writers of the early sixteenth century, certainly should be made the subject of a monograph. Mazza (col. 57) lists also Marc' Antonio Zimara among the professors of Salerno, but I have found no evidence of his teaching. Among the scientists to whom Lodovico Ferrari in 1547 sent his first pamphlet against Tartaglia (*I sei cartelli di mathematica disfida . . . di Lodovico Ferrari . . .*, ed. E. Giordani, Milan, 1876) is listed a certain Mattheo Mancino in Salerno, who may have been a teacher of mathematics.

[194] De Renzi, *Coll. Sal.*, I, 408 ff.

[195] *Ibid.*, 411.

[196] Sinno, "Diplomi di laurea," 226.

[197] *Coll. Sal.*, I, 415 f. Sinno, "Cronologia dei Priori," 306 f.

to confer degrees and licenses in medicine and philosophy, did not originate in the early twelfth century, as is commonly believed, but developed only during the second half of the fifteenth century and attained its final organization around 1500. This *Collegium* is different from the school or university itself, although there are many connections between the two institutions. The medical lore of Salerno in the twelfth century was prescholastic in origin and character, but towards the end of that century the school made its contribution to the development of the scholastic method, mainly through the method of using standard texts for the medical curriculum as appears first in the commentaries of Maurus, and through the close alliance between medicine and natural philosophy as appears in the works of Urso. This alliance was later developed, since logic appears as a required subject from the thirteenth century on, and natural philosophy at least from the late fifteenth century. Every examination for a degree henceforth included the *Physics* and *Posterior Analytics* of Aristotle, and the old *Civitas Hippocratica* had for centuries also become a *Civitas Aristotelica* when its school was finally closed in 1812 after more than 800 years of distinguished existence.

TEXTS AND DOCUMENTS

SIR RICHARD CROFT AND THE REGIMEN OF EXPECTANT MOTHERS

CHARLES F. MULLETT

Among the Stow papers at the Huntington Library is an untitled manuscript signed "R Crofts 1809," dealing primarily with the behavior of newly married women.[1] The contents themselves are not remarkable but, because of the authorship, the document deserves some attention. Sir Richard Croft (1762-1818) was perhaps the foremost English accoucheur of his day, and these words seem to be his only statement in any way related to his specialty.

The son of a chancery clerk, he began his medical training as apprentice to a practitioner and later studied at St. Bartholomew's Hospital. Apparently he never took a medical degree. He started his practice at Tutbury, Staffordshire, and later moved on, first to Oxford, then to London where he built up a distinguished clientele, listing the Duchess of Devonshire among his patients. He married a daughter of Dr. Thomas Denman (1733-1815) and on succeeding to his father-in-law's practice became easily the most famous accoucheur in England. In 1816 on the death of his elder brother, Sir Herbert Croft (1751-1816), a celebrated bibliophile, he inherited the family baronetcy. His fame and prestige turned to notoriety and disgrace, however, when his attendance on Princess Charlotte (1796-1817), the daughter of the Prince Regent, later George IV, proved so inept as to contribute materially to her death in childbirth. Although the royal family hastened to assure him of their complete confidence in his ministrations he obviously sensed widespread criticism of his conduct, criticism no doubt sharpened by the great popularity of the princess. Consequently, on February 13, 1818, he shot himself.[2]

Although Croft seems to have published no medical works whatever, his father-in-law was a prolific writer and has far greater claim to distinc-

[1] I am indebted to the authorities at the Huntington Library for permission to print this document, and to the University of Missouri Research Council for assistance in preparing it for publication.

[2] The account of Croft in the *Dict. Nat. Biog.* is based almost entirely on three pieces in the *Gentleman's Magazine*: LXXXVII (1817), pt. ii, 449-52; LXXXVIII (1818), pt. i, 188-89, 277-78, which trace in detail his connection with Princess Charlotte's death.

tion in obstetrics.[3] He had served as a naval surgeon before listening to William Smellie's lectures on midwifery.[4] He himself lectured on the same subject while acting as surgeon to the royal yacht and in 1764 he got an M. D. from Aberdeen. In 1769 he was appointed accoucheur at the Middlesex Hospital where he was the first to induce premature labor. His extensive writing on the subject included *Essays on the Puerperal Fever and on Puerperal Convulsions* (1768), *An Introduction to the Practice of Midwifery* (1782), and *Aphorisms on the Application and Use of the Forceps and Vectis on Preternatural Labours, on Labours attended with Hemorrhage and with Convulsions* (1783). This last was extremely popular, going through seven English and three American editions and being translated into French. He also wrote *A Letter to Dr. Richard Huck, on the construction and method of using vapour baths* (1768) as well as *Observations on the Cure of Cancers* (1810).

The following statement written at the height of Croft's prestige may be regarded then not only as his opinion but also as the best contemporary opinion on the subject. The occasion for its composition is indicated by the author himself in the first sentence; how it got into the Stow collection is not explained, but in all probability some member of the family was particularly concerned with the information herein contained, and nothing could be more proper than to secure directions from the most fashionable specialist in the field.

[*Advice to Young Married Ladies*]

Having very frequently received letters and been requested in conversation to give directions for the self management of newly married and pregnant Ladies: and not finding anything which satisfies my mind published on those subjects, except what is to be collected from various medical works, I have thought it would be of some use to write the following hints and observations for the purpose of lending them to my friends. If this should not enable young ladies to avoid all the inconveniences which, from want of such information, they are liable to suffer, still I trust it will be the means of preventing or removing much of that

[3] The *Dict. Nat. Biog.* has an excellent sketch of Denman who would seem indeed to warrant an even more detailed account of his career and achievements.

[4] William Smellie (1697-1763) began to practice at Lanark in 1720 as surgeon and apothecary after receiving a training the details of which are unknown. He settled in London in 1739 and in 1745 got an M. D. from Glasgow University. He wrote at length on midwifery and although his technique aroused controversy he has been characterized as one of the ablest practitioners of his time.

embarrassment, which they experience when under the necessity of detailing their complaints; and I hope, it will be of use to them, when they have no one with whom they can easily communicate on such subjects. Early marriages may for the general part be adviseable, but they certainly appear one cause or principal reason why many married ladies are but little informed, or wholly unacquainted with many things relative to the proper management of their persons and constitutions. It will readily be believed that to the sudden transition from the nursery as it were to the head of a family, may be indirectly attributed a considerable number of female complaints, and sometimes the disappointment and mortification experienced in families from the want of children. While under the watchful eye of a mother great attention is generally paid to every circumstance which relates to health and well being; they are generally restricted to eating plain things, to drinking one, or at most two glasses of wine in a day; they are accustomed to walking exercise, to early rising, and to keeping regular and good hours. When married these habits of living are too commonly, totally and suddenly changed, and this seems to be the consequence of the habits of indulgence which young gentlemen are accustomed to pursue. When placed at the head of a sumptuously provided table, and surrounded with visitors, how is it to be expected that a young lady should avoid partaking of such things, as she sees her husband and visitors enjoy: or withstand their solicitations to drink wine unless she is before told that either may be prejudicial. Late hours, according to the present fashion of the higher classes, are difficult to be avoided; and this is principally bad, as it deprives the ladies of their usual air and exercise, in consequence of which they frequently become inactive, corpulent, and out of health, under which circumstances pregnancy often fails to take place. The irritability and feebleness of some constitutions, where more attention has been paid to refined accomplishments than to the invigoration of the body, not only frequently prevents ladies becoming pregnant; but, when they are in that state, great assistance is often required from medicine and management, to conduct them safely through their pregnancy. Sometimes the anxiety and solicitude attending a long suspended marriage, will bring ladies into such a state of health, as to reduce their strength, and prevent their constitutions acting with vigour or regularity. Ladies are very apt to be inattentive to the care of themselves at certain periods, when all dancing or other kind of violent exercise, or exposure to cold should be avoided; and the wearing of a close under dress at these times, has to many ladies been found of very great service. From living almost solely in the company of females, at least in

the fore part of the day, young ladies are generally accustomed to attend immediately to every call of nature—and it is a very good thing when from habit they are performed with regularity. From inattention, or false notions of delicacy, very troublesome and even dangerous complaints have been frequently brought on. One lady, when performing a long journey immediately on her marriage, had no action of her bowels for eight days, the consequence of which was much present indisposition and pain, followed by piles, which continued troublesome for many years. Another lady under similar circumstances neglected repeated inclinations for emptying the bladder, till such time that she lost the power of doing it, when after thirty hours it was obliged to be done artificially. These are circumstances to be regularly attended to at all times, but during pregnancy the latter is of the utmost possible consequence. Every married lady should accustom herself to mark her pocket book at the coming on of a certain period, and she should be given to understand that its non-appearance at the regular time is always a sufficient reason for suspecting pregnancy to have taken place, though it is by no means an inevitable or certain proof that such is her situation. It is no uncommon thing for the solicitude of parents to persuade their new married daughters on even the slightest irregularity either in quantity, quality, time of return, or continuance that pregnancy has taken place; but whenever the period returns regularly as to time, however irregular it may be in any of the other particulars, it must always be considered a doubtful case and by consulting a proper person much mortification and disappointment may frequently be avoided. When irregularities of the female constitution come on immediately after marriage, they are very usually produced by the common change too generally made in the habits and mode of living; and these ladies, by being put upon a lowering plan of medicine and returning to their former habits, very frequently become regular and almost as frequently prove pregnant in a very short time. On this principle it is that we account for ladies becoming so often pregnant on their recovery from severe or even slight illnesses. Sometimes also from the want of strength and energy in the constitution, irregularities are occasioned, and in such a state, medicine of a different class will be necessary, and in short it may be generally concluded when ladies do not become pregnant within a certain time after marriage, that there is something wrong in their constitution which requires the assistance of medicine. It being once ascertained that pregnancy has taken place, most of the inconveniences, which usually attend that situation will be accounted for, and relieved upon the principle of increased irritability and sympathy. When

once a lady can bring her mind to acknowledge herself pregnant, she is far less likely to let any thing cause her to miscarry; and I have little doubt but one lady out of three, with her first child, meets with disappointment before she acknowledges her situation. Sickness, pain in the breasts, back and face, are among the most common and troublesome irritations, but distressing and difficult as they are to bear, it is a great consolation to know that they generally decrease, as pregnancy advances; and experience proves that those ladies have generally the finest children, and are the least likely to miscarry, who suffer the most from these symptoms. When the sickness is very violent, it may generally be mitigated by breakfasting in bed, by being much in the open air, by eating water ice, by the horizontal position, or by applying laudanum or an opium plaster to the pit of the stomach; or when it is excessive, from five to ten drops of laudanum may be taken as often as every six hours, or from four to six ounces of blood may be taken from the arm. Many people have received benefit from the application of a mixture of white of egg and laudanum to the loins every night at bed time. The pain in the breast and back is generally to be allayed by rubbing them with equal parts of laudanum and sweet oil; and that in the face will sometimes give way to the external application of ice, but it is frequently only to be mitigated by considerable doses of laudanum. When the pain in the back is not relieved by the application of laudanum, or opium, the horizontal position is the only thing to be depended on; and when it is attended with the slightest coloured appearance it ought to be considered as a threatening of a miscarriage. In that case in addition to the external application of opium, ten drops of laudanum should be taken directly on such appearance, and perfect quiet in the horizontal position should be enjoined, till medical advice can be procured. As walking very frequently brings on a pain in the back, I am very apt to substitute the term taking air for that of exercise, as in that case a lady either uses an open carriage or sits out of doors, and thus avoids fatigue, and that degree of exercise which brings on pain in the back. The very lavish use of cold water, even to having a large basin full dashed upon the back morning and evening, or the use of a cold or shower bath every other morning is the best preventitive against the pain in the back. It used formerly to be recommended to ladies pregnant to keep the bowels in a relaxed state, but later experience has proved that the opposite state of the bowels is not only the natural and of course most favorable to that situation, but in many instances it is one of the first symptoms of pregnancy, and some ladies never go on well but when their bowels are particularly inactive. In very delicate and irritable habits

when the bowels do not act spontaneously once in forty eight hours, instead of any kind of opening medicine, it may be prudent to take a lavement * of luke warm water or even cold water which will generally empty the bowels and prevent the necessity of voluntary exertions, and this may be safely repeated however often the necessity may occur. Some ladies are regular in their bowels, acting only once in three or four days during the early months of pregnancy, and when that action is neither attended with difficulty or requires exertion, it appears imprudent to counteract it. It sometimes happens that the bowels get into the opposite extreme or relaxed state, which may be considered an unfavorable substitute for the pregnant sickness, as we rarely see a miscarriage take place but with a relaxed state of bowels, except indeed when brought on from sudden accident or alarm. Opium, in its various forms, appears the only medicine capable of allaying this irritation of bowels; and should five or ten drops of laudanum, taken every four to six hours, not have the desired effect, fifty drops, taken as a lavement, in about three table spoonfuls of starch, or arrow root gruel, is almost certain to succeed; or what is used with less trouble and even more effect is a pill of a grain or two of pure opium, introduced into the rectum, or lower bowel, as a solid lavement or suppository which may be repeated night and morning if necessary. Piles and irritability of the bladder are very common attendant on pregnancy: the former is frequently prevented and sometimes even cured by the very frequent use of cold water lavements or the application of cold water with a sponge; the latter may be allayed by a tea spoonful of sweet spirit of nitre, taken two or three times a day in a cup of barley water, with gum arabic dissolved in it, but when very troublesome it may require ten drops of laudanum to each dose of the nitre. Bleeding is now seldom recommended, simply on account of pregnancy; but when any symptom appears for which bleeding would have been recommended at any other time, there is no period of pregnancy at which it may not safely be performed; and when any symptom of irritation runs very high, and cannot be allayed by opium, or other nervous medicine, such as camphor, aether, and a great advantage is frequently derived from the loss a few ounces of blood. In most cases of pregnancy, the general irritability of the body being greatly increased it should be your chief aim to lessen it by all the means in your power; the principal of which means is believed to be cloathing the body well in flannel, living as much as possible in the open air, and being very lavish in the use of cold water even to bathing. Sea air and bath-

* The best instrument for this purpose is made by Savigny, St. James St.

ing lessen general irritability more than anything with which we are acquainted at the time of quickening, or the first perceptible motion of the child, which is generally from fourteen to twenty weeks after the last recovery from a regular period, fainting is no uncommon thing, and should be treated as at any other time by exposure to fresh air, or giving wine or volatile spirits in water, as the case may require, but it is seldom of any essential consequence. Giddiness is a very common attendant upon pregnancy, and when it is the effect of common nervous irritability, is generally relieved by camphor mixture, with or without aether, or salvolatile. Ladies who live high during pregnancy, or who eat animal food, or eggs more than once a day, are the most liable to these affections, which will sometimes be kept off or suspended by a spontaneous bleeding from the nose. Whenever this is the case, bleeding may be necessary, opening medicines may be required, and a more abstemious mode of living should be enjoined; animal food should not be taken more than once a day, and all fermented liquors should be discontinued. When giddiness is attended with pain in the head, loss of sight, bleeding at the nose, or general symptoms of fullness it will be prudent and proper to consult some medical man who will most likely think it necessary to recommend bleeding and opening medicines. Ladies sometimes persist in taking exercise though it give them considerable pain and produces other inconveniences, under an idea that they are likely to have unfavorable and bad labours if they do not use exercise: but as a proof that this idea is ill founded, many ladies who have been for some particular reason confined nearly the whole forty weeks of pregnancy to a sofa have had remarkably good and easy labours. Those ladies who are equal to taking exercise without fatigue or other inconvenience should live as much as possible in the open air; but they should never walk till they bring on pain in the back. There is no time or period of pregnancy at which fatigue or violent exertion may not bring on labour, and whenever it is brought on prematurely, it is less likely to proceed regularly or terminate favorably; and a labour brought on before the end of the thirty-first week is little likely to live. Some ladies appear seldom to sleep more than an hour or two of a night, but still they rise in the morning apparently well refreshed: by getting out of bed, and walking the room for a few minutes, the air will sometimes have the effect of causing them to sleep immediately on returning to bed. Ladies who have been in the habit of miscarrying ought when they pass the time of the first period, to consider themselves pregnant, and from that time they should avoid everything that calls upon them for bodily exertion, or is likely to expose them to fatigue or restraint. They should

never attempt doing anything which from experience they have reason to believe will produce pain in the back, or cause them to feel otherwise uncomfortable. They should live as much as possible in the open air; and let the weather be ever so cold, provided they clothe accordingly, an open carriage is the best method of getting air, without being fatigued by exercise. Formal and large dinner parties, morning visitings, shopping, crowded and heated rooms, and late hours, all the frequent consequence of a London life, are very bad and injurious, and ought cautiously to be avoided. High living is full as improper during pregnancy, as it is before, yet sometimes when the appetite is very bad and capricious we allow ladies to eat anything they happen to fancy. It is not desirable that a lady should become lusty or corpulent during pregnancy, as when that happens they generally produce poor and feeble children. Some ladies are unable to get through the full period of pregnancy except when they are living upon milk and vegetables, without tasting a particle of animal food; and I have known ladies who have only been able to go on, while drinking a bottle of claret every day for six or seven months together. Such is the difference of constitutions. This not being intended as a publication, I have been little solicitous about the language, further than to express myself plainly.

R Crofts [5]
1809

[5] The variation in spelling, Croft and Crofts, I think of no importance; those were still days when people were neither consistent nor scrupulous in such matters.

NOTES AND COMMENTS

ARABIC TOOTH-WORM STORIES

MAX MEYERHOF

I have read with great interest B. R. Townend's " Story of the Tooth-Worm " in No. 1 of vol. XV of the *Bulletin of the History of Medicine*. It goes without saying that the Arabs firmly believed in worms as causes of toothache and dental caries, as can be seen, e. g. in the seventh *Fann* of the great *Canon of Medicine* of Ibn Sina (Avicenna). But there are also stories of charlatans in Arabic speaking countries who pretended to extract worms from the teeth of sufferers and who thereby succeeded at the same time in extracting money from their pockets. They are found in some of the Arabic treatises on *Hisba* (supervision of market dealers), but the most detailed account is given by one 'Abd al-Rahim al-Jawbari of Damascus, who lived in the first half of the XIIIth century A. D. and left a treatise entitled *Kitab al-Mukhtar fi Kashf al-Asrar* (" The Book of Selections Touching the Revelation of Secrets "), in which he describes the tricks of quacks, charlatans, alchemists, jugglers and thieves. It has been printed and exists in MSS. in several libraries, but the Arabic text is not at my disposal. I therefore rely on Eilhard Wiedemann's translation of the passage concerning the tooth-worm, which appeared in his *Beitraege zur Geschichte der Naturwissenschaften* Nr. XXV (Erlangen 1911, p. 223 f.). It reads as follows:

The fifteenth Section: On the Revelation of the Secrets of Those who Extract the Worm from the Tooth.

These people are greater impostors than the others, as they promise to accomplish a thing which does not exist. For they make the public believe that they are able to extract a worm from teeth, thus deceiving them and prescribing a remedy without value.

When they want people to see that they really extract the worm from a tooth they take an euphorbia plant (*la'iya*), dry it in the shade and crush it to a pulp. They then take a worm like those which are found in fruits, wrap it in the leaf of a fruit-tree, bind it with a thread and leave it until it is dried and holds the worm more closely. Then they knead the plant into a kind of cake and put the leaf containing the worm into it; all this time the worm is feeding on the leaf. When they want to feign extraction of the worm they take with their fingertips a piece from that cake containing the leaf with the worm. The quack puts this piece on the tooth and says: Close your mouth! When the sufferer closes his mouth the

cake is softened and the worm is released. The quack then says: Open your mouth! And when the patient obeys he inserts a forceps and, seizing the worm, draws it forth in the presence of the onlookers, thus deluding them with thinking that he had extracted the worm from the tooth.

Others take tendons of camels, cut them with scissors into strips of the size of a small worm and dry them. They then hide them in a similar cake. When they want to extract a worm from a tooth they take a little of that cake, leave it on the tooth until it is warm, then open it and extract the "worm." Nobody doubts that it is a worm that has been extracted from the tooth; they are convinced of it, and he takes advantage of their state of mind to sell his cure.

Others pretend that they are able to extract the worm without the use of a hook, a lancet or any instrument. They take some resin of the olive tree, mix it with the milk (latex) of euphorbia and shape it into a cake. When they are about to extract the worm they scarify the gum with a lancet until it (the hole in the tooth?) becomes visible and then put on it the remedy, rubbing it in thoroughly. Then the gum comes readily away from the tooth and they pull it (the "worm") out without the use of a forceps and without pain. But this is done only by prominent and learned men amongst them (the charlatans); it is one of the secrets of science.

Then follow other tricks of such quack-dentists. One is tempted to think that al-Jawbari did not believe in the existence of the tooth-worm, but he does not say so. His purpose in this part of his book is only to expose the frauds of itinerant dentists.

MEDICO-HISTORICAL NEWS AND ACTIVITIES

AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE

CONSTITUENT SOCIETIES

The Beaumont Medical Club, New Haven, Conn.

The sixty-ninth meeting of The Beaumont Medical Club was held in The Beaumont Room, Yale Medical Library, on February 2, 1945. The following program was presented:

1. Exhibition on The History of Surgical Anesthesia.
2. The History of Poliomyelitis—Dr. John R. Paul.

The New York Society for Medical History

The Society held its regular monthly meeting on February 1, 1945 at the New York Academy of Medicine. Dr. Fenwick Beekman spoke on "A Celebrated Case of Cerebral Injury," and Dr. Arturo Castiglioni on "Learning and Teaching at Old Bologna."

The Johns Hopkins Institute of the History of Medicine

Dr. J. M. D. Olmsted, Professor of Physiology at the University of California, has accepted an invitation to deliver the Hideyo Noguchi Lectures during the academic year 1945-1946. His subject will be the life and work of Brown-Séquard.

The Johns Hopkins Medical History Club, Baltimore, Md.

The second meeting of the year was held on February 19, 1945 in the Lecture Hall of the Institute of the History of Medicine. A brief business meeting was first held at which the following officers were unanimously elected:

President: Dr. Adolf Meyer
Vice-President: Dr. A. R. Rich
Secretary and Delegate to the Council of the A. A. H. M.: Dr. Owsei Temkin

The program was as follows:

Jerome Cardan (Commemorating the 400th Anniversary of His Book *Ars Magna*).
Captain James Eckman, MAC

The Relationship between Geoffroy Saint-Hilaire and Lakanal.
Dr. Owsei Temkin

NATIONAL NEWS

Benjamin Rush Bicentenary

Benjamin Rush was born near Philadelphia on December 24, 1745. The 200th anniversary of his birth will be commemorated by the Johns Hopkins Medical History Club, and the Editors of the *Bulletin of the History of Medicine* intend to devote the December number of 1945 to Rush. It will contain a series of papers illustrating and evaluating the manifold activities of Rush.

NEWS FROM LATIN AMERICA

Argentina

The most recent issue of *Revista Argentina de Historia de la Medicina* (Año IV, Nº. I, Diciembre 26 de 1944) contains the following original articles:

Juan Ramon Beltran: Historia de la Psiquiatría.
Douglas Guthrie, M. D.: El "Breviario" y "Dietario" de Andrés Boorde (1490-1549), médico, sacerdote y viajero.
José R. Naveira: Síntesis histórica de la Astronomía en la Argentina.
Angel E. Roffo, Jr.: Cuándo se produjeron por primera vez los rayos Roentgen? Trabajos de William Morgan, 1875.

University of Buenos Aires, Argentina

Dr. Aníbal Ruiz Moreno has just been appointed Professor Adjunto de Historia de la Medicina in the Facultad de Ciencias Médicas of the University. A student of Professor Juan Ramon Beltran, he is the first to secure the title of Professor Adjunto in Medical History.

Venezuelan Society of the History of Medicine

On July 28, 1944 the Venezuelan Society of the History of Medicine was founded by a group of physicians who unanimously elected as first president Dr. Santos A. Domínici. Dr. Domínici had established the chair of Clinical Medicine in Venezuela in 1895 and was one of the founders of the Sociedad de Médicos y Cirujanos of Caracas and of the Pasteur Institute. The Secretary of the new medical history society is Dr. Joaquín Díaz González. The Society hopes to create a museum and library of the history of medicine and to publish its own journal.

NEWS FROM EUROPE

England

On December 15, 1944 a special meeting was held at the Royal Society of Tropical Medicine and Hygiene, London, to commemorate the 100th anniversary of the birth of Sir Patrick Manson (1844-1922), the "father of tropical medicine." An illustrated address "The Manson Saga" was given by his son-in-law, Sir Philip Manson-Bahr.

QUERIES

The Library of the Western State Psychiatric Hospital, O'Hara and Desoto Streets, Pittsburgh, Pa. is most anxious to obtain a copy of Volume I, 1933, of this *Bulletin* which is out of print. Will anyone who knows of an available copy for sale please communicate with the Librarian, Miss Mary M. Moss.

If any of our readers know where there is a copy of *Mémoires du chevalier Jean de Carro*, Carlsbad, imprimerie des frères Franiak, 1855, in this country, please communicate with Dr. Henry E. Sigerist, 1900 E. Monument Street, Baltimore 5, Md.

ERRATA

Our readers have kindly brought our attention to several typographical errors in recent issues of the *Bulletin*. In the July 1944 issue (Vol. 16, No. 2), page 114, line 16 from bottom: for "1939" read 1839. In the December 1944 issue (Vol. 16, No. 5), page 471, line 15 from bottom: for "Hanson" read Armauer Hansen. We are indebted to Dr. R. P. Bigelow and Dr. Anna Tjomsland for this information.

BOOK REVIEWS

Essays in the History of Medicine, presented to Professor Arturo Castiglioni on the occasion of his seventieth birthday April 10, 1944, Supplements to the Bulletin of the History of Medicine No. 3, Baltimore, The Johns Hopkins Press, 1944. vi + 358 pp., illustrated. $3.50.

As Iago Galdston remarks in his contribution to the present volume, the *Festschrift* is a most civil custom permitting " the public show of affection which otherwise might not be in good taste." It is therefore with great pleasure that we greet this volume of *Essays in the History of Medicine* presented to Professor Arturo Castiglioni on his seventieth birthday, for here both he who gives and he who receives are honored, the former by being given an opportunity to express appreciation for the accomplishments of an outstanding scholar, the latter by the gifts of his confrères and friends.

The contributions are highly diversified both in content and style, and range in time from prehistory to the present day. One can do no more than point out a few of the papers that are of the greatest interest to the reviewer. There are a number of contributions from Latin American historians; Juan Ramon Beltran on the role of medical history in the training of the physicians; Carlo Foà writes on a museum of psychiatry and criminal anthropology organized by Lombroso; Juan B. Lastres contributes a paper on the medicine of the Peruvian aborigines; and Martínez Durán discusses American hospitals during the colonial period. George Sarton discusses the work of Beccaria; George Urdang analyzes the role of retail pharmacy in the development of the pharmaceutical industry; Max Neuburger contributes further material to his study of the relations between British and German medicine; Luisada presents a chronology of cardiology; and Magnus-Levy deals with the diabetic diets of the pre-insulin era. John Fulton has an interesting paper on an early phase of medical historiography; C. F. Mayer discusses an undescribed epidemiological monograph of the Cinquecento; and E. B. Krumbhaar and W. B. McDaniel, 2d present early possible descriptions of diphtheria.

Of the greatest interest to the present writer, however, are the papers by Erwin H. Ackerknecht on Paul Bert; Ludwig Edelstein on Sydenham and Cervantes; Iago Galdston on J. A. F. Ozanam; Genevieve Miller's description of an early American naval medical chest; Curt Proskauers' paper on early dentistry in Germany; and Olschki's contribution on medicine and Marco Polo.

The paper by Ackerknecht is an outstanding contribution to the medical history of 19th century France, particularly the latter half of the century, a period which deserves more attention than it has received. In his paper Ackerknecht raises a very important problem, namely, that of generations in medical history. He refers to the generation born between 1830 and 1840, but the same phenomenon can be observed with an earlier generation, that of Cabanis, Fourcroy, Thouret, etc. who are likewise overshadowed in the history books by Laennec, Bayle and all those others who actually built on the foundations laid by their predecessors. If more

attention were paid to this line of investigation, we might arrive at a clearer understanding of the great contributions in the history of medicine, which until now have more or less been regarded as the products of genius operating in a vacuum, rather than as the peaks or culminating points of gradual developments, much like the coral reef of which only the topmost piece emerges above water while the coral organisms that have brought this about remain unseen beneath the surface.

Galdston in his paper on Ozanam calls attention to an interesting figure in the history of epidemiological theory, and at the same time points up the problem as to why contributions that would seem to be worthy of remembrance are forgotten or entirely overlooked. Here we came upon the fundamental problem of the sociology of knowledge. Galdston explains the eclipse of Ozanam because he "came and worked in the dawning years of bacteriology." But Ozanam's second edition was published in 1835, long before the new science of bacteriology could have any influence on the older theories. After all, we should not forget that the concept of "contaminated air" as a cause of communicable disease was still current as late as 1898. (See: Lewes, C. L.: *Southwood Smith. A Retrospect*, Edinburgh and London, William Blackwood and Sons, 1898, footnote on page 30; also Newsholme, A.: *Fifty Years in Public Health*, London, 1935, p. 118.) Is it not more plausible to suggest that an explanation must be sought within the narrower technical field, that is, epidemiology, as well as in the broader societal field, for instance, in the effect of epidemiological theory on trade (the whole problem of governmental action and economic factors in dealing with communicable diseases)? Finally, an effort must be made to trace the possible interaction of the two fields.

But enough for the present. One could discuss the articles in this most interesting volume at great length, yet I believe enough has been said to show the reader that this Festschrift for Professor Castiglioni is both a worthy tribute to a scholar who has enriched the world through his work, and a highly interesting contribution to medical history.

GEORGE ROSEN

GESNERUS. Vierteljahrsschrift, herausgegeben von der Schweizerischen Gesellschaft für Geschichte der Medizin und der Naturwissenschaften. Begründet durch J. Strohl, Zürich. Redigiert von H. Fischer, Zürich. Verlag H. R. Sauerländer & Co., Aarau. Jahrgang 1, 1943, Heft 1 ff. (Annual subscription, Swiss francs, 12.00.)

The war has greatly stimulated historical studies, for obvious reasons. A generation that finds itself in the midst of a gigantic historical process cannot but reflect about the events, and endeavor to analyze their causes and mechanisms. There can be no doubt that science is one of the basic determining factors in the present process. Indeed, science has revolutionized the mode of production of the Western world, in industry as well as agriculture. It has created a new technology that is breaking the frame work of the old social order and calls imperatively for adjustments. Hence no historical analysis can hope to succeed unless it takes the history of science into full account.

The people of Europe, who are closer to the war than we in America, are paying increased attention to the history of science, and a symptom of this awakened interest is the foundation of a new journal in Switzerland. It is published by the Swiss Society of the History of Medicine and Science and is named for Conrad Gesner, the great Swiss humanist, scientist, physician and bibliographer.

Three numbers have been received so far. They contain interesting articles that cover a wide range of subjects. The first number recalls the memory of two men who were close to the journal and who both died before it came out, Jean Strohl and Arnold C. Klebs. Strohl founded the journal, wrote the preface to it in the summer of 1942 and died suddenly a few months later. H. Fischer, in Zurich, who is now editor of the journal pays a warm tribute to the rich personality of Strohl who was an outstanding historian of biology and for many years president of the Swiss Society.

Arnold C. Klebs who founded the Swiss Society in 1921, whose home and library were a place of pilgrimage and a center of inspiration to all medical historians, died in March 1943, before the new journal came out. His memory is recalled in two articles by E. Olivier and G. Piotet.

It is impossible to discuss all the articles contained in these three numbers. They deal with viticulture in ancient Greece, Galen, Pseudo-Apuleius, Vesalius, the humanist Ruinella, Galileo, Lavoisier. The journal has book reviews and as a most valuable feature, a Swiss Bibliography of the History of Science and Medicine, which lists all publications on the subject issued in Switzerland, those published by Swiss scholars abroad and foreign publications dealing with Swiss subjects.

Gesnerus is a most welcome addition to our periodical literature and we are looking forward to further issues.

HENRY E. SIGERIST

BERNHARD J. STERN. *American Medical Practice in the Perspectives of a Century.* New York: The Commonwealth Fund, 1945. xvi + 156 pp. $1.50.

Social and economic thought have been in considerable ferment in recent years, and it is obvious that medicine as a vital element of the body politic could not remain impervious to the prevailing climate of opinion. Conscious of this situation the Council of the New York Academy of Medicine on January 27, 1943 authorized the establishment of a Committee on Medicine and the Changing Order. The Comittee began to function on February 25, 1943, and is expected to continue its work until April 1946 (see *An Interim Report of the Committee on Medicine and the Changing Order to the Fellows of the New York Academy of Medicine*, January, 1945). Stated in general terms, the objectives of the Committee are to be informed on "the nature, quality, and direction of the economic and social changes that are taking place now and that are clearly forecast for the immediate future; to define in particular how these changes are likely to affect medicine in its various aspects; to determine how the best elements in the science of medicine and in its services to the public may be preserved and embodied in whatever social order

may develop, so that ultimately the best possible medical care may be made available to the largest number of persons at the most economical costs."

The Committee is composed of physicians, representatives of the dental and nursing professions, and laymen. It undertook to achieve its aims by means of conferences and studies carried on concurrently. These studies, of which the volume under review is the first to appear, were planned to provide essential information for an understanding of the medical situation and its trends.

Stern's study begins with a description in broad strokes of the social and economic changes that have occurred in the United States within the past hundred years. Against this panoramic backdrop he traces the general outlines of the medical developments during this period. Stern then sketches the consequences of these changes, the growth of specialization, the increasing costs of medical care, the development of the modern hospital, the lengthened duration and costliness of medical education, and finally he considers the adequacy of medical care and the distribution of medical services. In short, Stern has given us a brief analysis of the reciprocal interaction between the economic and social forces, that are loose in the world today, and the field of medicine. It should be pointed out that this study despite its title and the first two chapters, is not a historical study. For the most part it is devoted to the last thirty years.

Naturally, in a brief telescoped monograph of this kind, flaws could be pointed out; for instance, the lack of emphasis on industrial medicine, rural conditions, and the like, but as these subjects are to be considered in succeeding books, Stern is certainly justified in dealing briefly with them.

In his discusion of specialization in this country Stern, in the opinion of the reviewer, overemphasizes the role of technology, and omits altogether the foreign influences that helped to bring this form of practice into being (see George Rosen: *The Specialization of Medicine*, New York, Froben Press, 1944, chapters III, IV and V).

Taken as a whole, however, this little book is an excellent introduction to the social, and even more so to the *economic* problems of medical practice. It more than fulfils the intention of the author and deserves to be widely read not only by the members of the medical and allied professions, but by every citizen interested in one of the vital problems facing our country—namely, the problem of medical care.

GEORGE ROSEN

FREDERICK II OF HOHENSTAUFEN. *The Art of Falconry, being the De Arte Venandi cum Avibus.* Translated and Edited by Casey A. Wood and F. Marjorie Fyfe. Stanford University Press, Stanford University, California; Humphrey Milford, Oxford University Press, London, 1943. cx + 637 pp., illustrated. $10.00.

Casey A. Wood who died in 1942 at the age of 85 was one of the last representatives of that great generation of American physicians who succeeded in combining the old humanities and the new science in most fortunate way. They were

educated men, keen and alert, interested in every aspect of life. They became physicians because medicine was the most humane field of science in which a man could make a living. They achieved great accomplishments in one of the disciplines of medicine without ever becoming narrow specialists. They were scientists, but humanists also. In the last fifteen years they have been dying away fast, and the country is greatly impoverished because the gap they have left is not being filled.

Casey A. Wood was a friend of William Osler. They both graduated from McGill University which today is proud to possess the Osler Library of the History of Medicine and Science and the Wood Library of Ornithology. Wood had much in common with Howard A. Kelly who was a gynecologist of renown but also a universal naturalist, an expert on snakes, and also a great lover and collector of old books.

As a young man, Casey A. Wood went into the field of ophthalmology to which he made important contributions. Before the first World War he was professor of ophthalmology in various universities. He then served with distinction in the Medical Corps of the Army, and after the war he spent many years travelling and living abroad, in Europe, in Asia and in the South Pacific. These were years of intense study, in science and history. As an ophthalmologist, Wood was particularly interested in the eye of animals and more especially of birds whose eyesight is so keen. During the war he published an important, beautifully illustrated monograph on "The fundus oculi of birds especially as viewed with the ophthalmoscope." He collected ornithological books, and many papers relate the observations he made during his travels abroad.

Casey A. Wood was also greatly interested in the history of medicine to which he contributed a number of papers and particularly a translation of the ophthalmological treatise of the Arabic physician Ali Ibn Isa.

A man who combined ophthalmology, ornithology and history was predestined to undertake a study of one of the Middle Ages' great books, Frederick II of Hohenstaufen's *De arte venandi cum avibus*. It was to be his swan song. He worked on it for a long time, aided by his niece and his scholarly collaborator for many years, F. Marjorie Fyfe. The result of their cooperative efforts is a scholarly and beautiful book that contains not only a translation of the treatise but a series of additional essays by the translators and other writers which together give a well-rounded picture of the noble art of falconry.

To historians of medicine Frederick II is best known for his edict regulating the practice of medicine in his empire. In requiring three years of pre-medical education, five years of medicine, one practical year, examination by the masters of Salerno in the presence of representatives of the State, he set in the 13th century a pattern for the licensing of physicians that became universal and has never been surpassed.

This edict is a vivid testimony of Frederick's administrative ability. His court at which German, Italian and oriental influences converged was, moreover, a great center of learning. Keenly interested in science, he had the biological and zoological treatises of Aristotle translated. And his book on falconry is much more than a manual for noble sportsmen; it is a scientific treatise.

The translation would have been relatively easy if a critical edition of the original Latin text had been in existence. Strange as it seems this was not the case. The editio princeps, published in Augsburg in 1596, was made from one manuscript, and the edition of Johann Gottlieb Schneider (Leipzig 1788-89) followed the text of the editio princeps. The two German translations of 1756 and 1896 were made from the printed text. Wood and Fyfe, therefore, had to resort to the manuscripts of which they made a careful study.

The text has been transmitted in 12 manuscripts that fall into two main groups, one in which the treatise is divided into 6 and one in which it is divided into 2 books. The treatise was actually never quite completed. Frederick worked on it for a number of years until 1250. Charles H. Haskins was probably right when he said that the emperor left a copy to his son Manfred with notes for the completion of the book. Manfred, who was also a great adept in falconry, prepared a new revised edition, and we possess the result of his work in the Vatican MS. Pal. Lat. 1071, but he also died before his task was completed.

Wood and Fyfe based their translation on the two most important manuscripts, Bologna Lat. 419 (717) and Vat. Pal. Lat. 1071, indicating variations of the text of these and other mss. in footnotes. We can only deeply regret that they did not give us the much needed critical Latin edition. After having studied the manuscripts as carefully as they did, and having had to decide in every single case which reading they would accept or reject, they would not have found it difficult to edit the original text critically. Without it we have to accept the translation on credit, and further research will have to wait until the Latin original text has been reconstructed from the manuscripts.

This criticism does not detract from the value of the book which in its present form is undoubtedly a great contribution to the history of science and to the history of mediaeval culture at large.

Special mention must be made of the 186 beautiful plates that constitute a regular iconography of falconry. The book furthermore contains an "Annotated roster of birds that are mentioned, depicted by, and were probably familiar to Emperor Frederick II," an "Annotated bibliography of ancient, medieval and modern falconry," and "A combined Latin-English and English-Latin glossary of words, terms, and expressions peculiar to ancient, medieval and modern falconry," contributions that are of great scholarly value.

The Stanford University Press is to be congratulated for having produced a great and beautiful book in difficult times, and for having made it available at a price that even scholars can afford.

It is sad to know that Casey A. Wood has left us. He was a warm friend of our Institute to which he gave a valuable collection of Sinhalese manuscripts. And yet, when a man dies at a ripe old age, after a full and well spent life, and when from beyond the grave he presents the world with a monumental book such as this, you cannot help but feeling that the gods have been benevolent. Casey A. Wood will always hold an important place in the history of America's cultural life. His was an unusual personality and his biography must be written. Nobody could do it better than Dr. Burton Chance, of Philadelphia, who was close to him in many respects. Let us hope that he will undertake the task.

HENRY E. SIGERIST

HANS FISCHER. Briefe Johann Jakob Wepfers (1620-1695) an seinen Sohn Johann Conrad (1657-1711), Studiosus medicinae zu Basel und Leyden. *Veröffentlichungen der Schweizerischen Gesellschaft für Geschichte der Medizin und der Naturwissenschaften* XIII. Aarau: Verlag H. R. Sauerländer & Co., 1943. 68 pp., 3 ill., 3 Swiss francs.

BERNHARD und HEINRICH PEYER. Bildnis und Siegel des Arztes Johann Conrad Peyer, 1653-1712. *Veröffentlichungen der Schweizerischen Gesellschaft für Geschichte der Medizin und der Naturwissenschaften*, Beilage zu Band XIII. Schaffhausen: Buchdruckerei Kühn & Co., 1943. 41 pp., frontispiece and 5 plates. 5 Swiss francs.

Since 1922 the Swiss Society of the History of Medicine has published 13 monographs, a remarkable series that should be in every library that cultivates medical history. In its most recent issue Hans Fischer, Professor of Pharmacology at the University of Zurich, Editor of *Gesnerus*, and a very active medical historian, has published 5 letters of Johann Jakob Wepfer to his son Johann Conrad who at that time (1676-1678) was a student of medicine, first in Basel, then in Leyden.

Schaffhausen never had a university, but in the 17th century the city could boast of having some of Europe's most famous physicians within its walls, men who made significant contributions to medical science. The senior of the group, Johann Jakob Wepfer (1620-1695), is particularly known for his studies on the blood vessels of the brain, while the names of Johann Conrad Peyer (1653-1712) and Johann Conrad Brunner (1653-1727) have become part of the anatomical nomenclature of the intestinal system. The best description of the Schaffhausen School is given in a collection of letters that Conrad Brunner and Wilhelm von Muralt published in 1919.[1]

The extant papers of the Wepfer family are preserved today in the Central Library at Zurich, and it is from this collection that Fischer published the five letters of Wepfer to his son, in the Latin original with a German translation. The letters are in no way unusual, but are nevertheless interesting documents of the period. They convey information on scientific matters, a father's advice to his son, news of relatives and friends.

Two points are particularly striking to the reader of these letters. One is that the training of a small-town Swiss doctor at that time foresaw the study of medicine first at the home university at Basel, then at the foremost medical school of Europe, Leyden, to be followed after graduation by a study tour to England and France. This was about the best that Europe could give at that time. It is characteristic of the international outlook that prevailed in Switzerland and explains why the standard of medical practice was high then as it is today.

Another striking point is the enormous incidence of illness in those days.

[1] *Aus den Briefen hervorragender Schweizer Aerzte des 17. Jahrhunderts.* Basel: Benno Schwabe, 1919.

Typhoid, dysentery, malaria were playing havoc. Every letter tells of sick relatives and friends, and Johann Conrad Wepfer himself contracted a quartan fever at Leyden that greatly worried his father.

The letters are fully annotated. The introduction discusses medical conditions in Basel, Leyden, England and France in the second half of the 17th century. As a pharmacologist Fischer was particularly interested in the drugs mentioned. He identified and discussed them critically and added a special discourse on the history of the cinchona bark.

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It seems almost unbelievable that no portrait should have been known of so famous a physician as Johann Conrad Peyer. There was no photography at that time to be sure, but paintings, drawings and sculptures were made of people of any standing, which were frequently reproduced in engravings. There is no question that portraits must have been made of a man like Peyer who had an international reputation, was a member of foreign academies and, in addition, came from a patrician family. And yet none was known until a few years ago when an excellent miniature painting was found. It is reproduced in color and fully discussed by his descendants, Bernhard and Heinrich Peyer, who also studied and analyzed the various seals that he used.

Letters were secured with sealing wax, and the seal usually consisted of an individual's initials or of his family's coat of arms. However, the statutes of the Academia Caesareo-Leopoldina Naturae Curiosorum, founded in 1652, requested the members to wear a golden ring with the Seal of the Academy. Peyer became a member in 1681 and from that time frequently used the seal of the academy which represented an open book with on one side an eye illuminated by the rays of the sun breaking through the clouds and, on the other side, the motto, *nunquam otiosus.*

Both publications give great credit to the Swiss Society, and paper, printing and illustrations have not suffered from wartime restrictions.

HENRY E. SIGERIST

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The Autobiography of Giambattista Vico. Translated from the Italian by MAX HAROLD FISCH and THOMAS GODDARD BERGIN. Ithaca, New York: Cornell University Press, 1944. viii + 240 pp. $2.50.

Though this book does not deal with medical history as such, readers of the *Bulletin* will be interested in the appearance of what is the first complete English version of any of the writings of Giambattista Vico (1668-1744), together with introductory essays on Vico's thought and influence.

If we had to characterize briefly Vico's contribution to the history of thought, it would not be unjust to say that he brought to the study of human history and certain of its branches, e. g. literary, legal, and political history, a sense of realism which was opposed to the naïve type of rationalism current in his day. It was this realism and what may be called an anti-intellectualistic pragmatism that fore-

shadowed the historical methods which flourished in the nineteenth century. And so, quite apart from the question of the soundness of Vico's views, it is no wonder that he was unappreciated in his own time. But to what extent the trends of the nineteenth century and of our times are directly or indirectly due to him is one of the thorny questions which Dr. Fisch discusses in the Introduction. This question calls for an examination of Vico's thought and the main lines of its influence in Europe and the United States. The author, while admitting that some of the evidence still has to be sifted, gives us a wealth of soundly documented material and reveals scholarship of a high order in integrating and interpreting this material.

The Autobiography is selected for translation because it is the work through which Vico's thought is usually first approached. But it also has a special literary appeal of its own. It is at once an intellectual history of the man, and a moving account of a life of personal misfortune and material failure. The translation is not only painstakingly accurate, but in its style beautifully recreates the spirit of the original.

Altogether, then, the volume is an excellent introduction for English readers to the work of a man who deserves to be far better known than he is at present.

I. E. DRABKIN

WILSON T. DAVIDSON. *Years of an Army Doctor: An Autobiography.* San Antonio, Texas: The Naylor Company, 1944. 189 pp., illustrated. $3.00.

Dr. Davidson's book relates the events of a very active and, by inference, interesting life. Unfortunately the incidents are reeled off in a manner which is ultimately incoherent since they are not integrated into a whole; the tale is a long string instead of a fabric, with colorful anecdotes attached only by a thread of association. Many paragraphs introduce a subject which promises interest but which is dropped unconcluded. Despite the deficiency of literary style, the book will undoubtedly have value as an historical document.

JEAN C. SABINE

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